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THIS WEEK IN THE

IRON AGE

Vol. 158, No. 8 — August 22, 1946

Editorial

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Technical Articles

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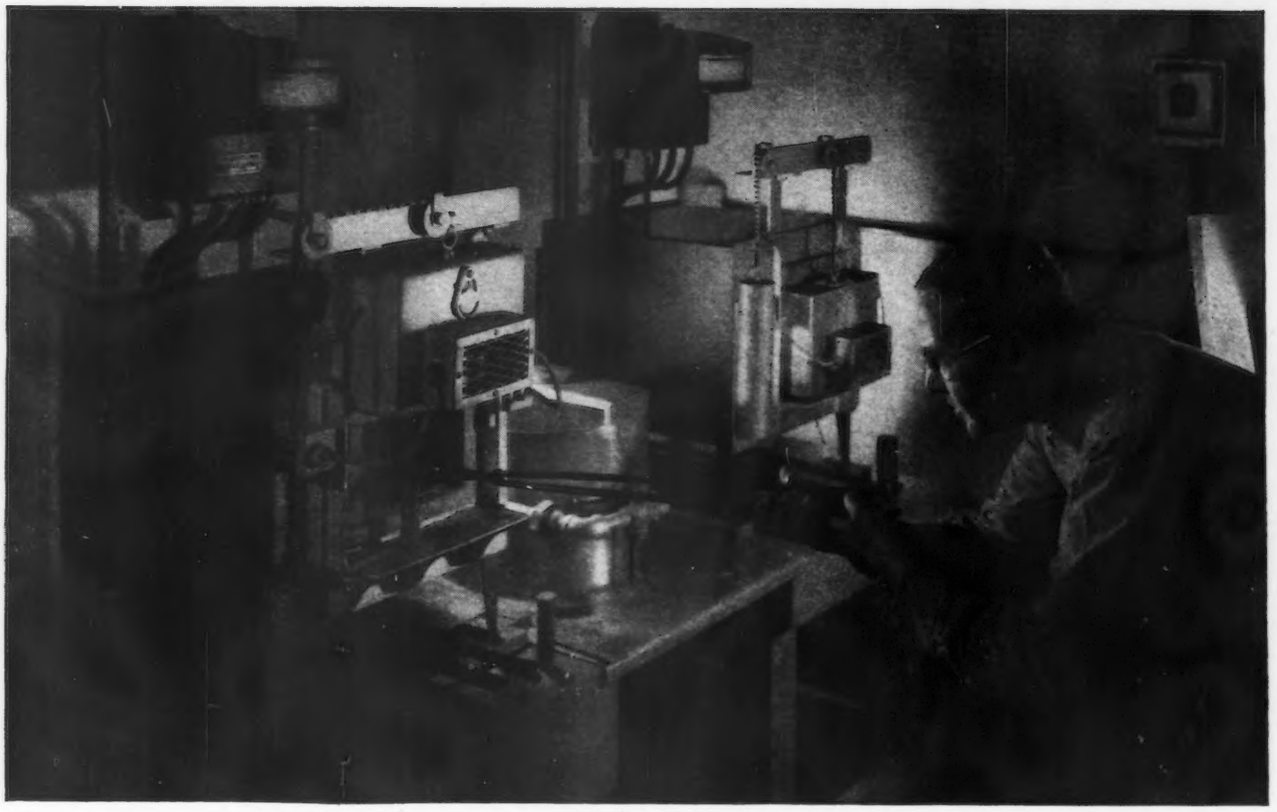

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Because of the steel shortage many sizes still are missing from Ryerson stocks, but your size or a workable alternate may be available. Contact the nearest Ryerson plant when you need steel.

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August 22, 1946

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Let's Release the Brakes*

ONCE upon a time a number of people got together to build a marvelous machine that would turn out an enormous quantity of goods of every description with the least possible effort.

It was the greatest mechanism ever invented and put together and it should have produced enough to make everybody happy. But unfortunately, from time to time some part would break down or cease to function properly.

When this happened, everybody suffered. Lawyers and law-makers would be called in to devise and pass laws to make this machine work but that did not do much good, because the gears and pinions, shafts, pulleys and motors of the machine did not understand law. Nobody thought of calling in the engineers to fix it.

The machine age was built by engineers but is being run by lawyers and politicians. Maybe that's why we are in the mess we are in today.

I was glad, therefore, to see some of our engineers and scientists step out recently and tell what they think should be done with the atom bomb. Nobody knows more about handling a tiger than the keeper who brought it up from a cub. Or better knows how dangerous it is to play with.

I hope that this is the start of an innovation, so to speak, whereby our engineers will emerge from their technical shells and play the important part that I know they can in putting our economic machine in order.

Engineers and production men know how the wealth and prosperity of a nation are built. The man in the street and the majority of workers in our plants have no conception of it.

Engineers and production men and progressive management know that all wealth, however it may be distributed after it is created, must come from productivity. And that to increase public wealth, whether in the form of wages, profits or taxes, you must continually strive to increase productivity. And not merely total productivity which could be done by importing 50 million Chinamen, but productivity per hour and per capita.

The old notion was that public wealth came from the possession of an abundance of natural resources. But resources do not become wealth until produced. Take China, Russia or India for example. Each has a richer and greater supply of natural resources than has the United States but there is no comparison in national wealth because there is no comparison in the rate of productivity.

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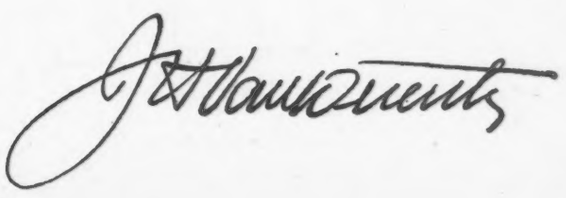
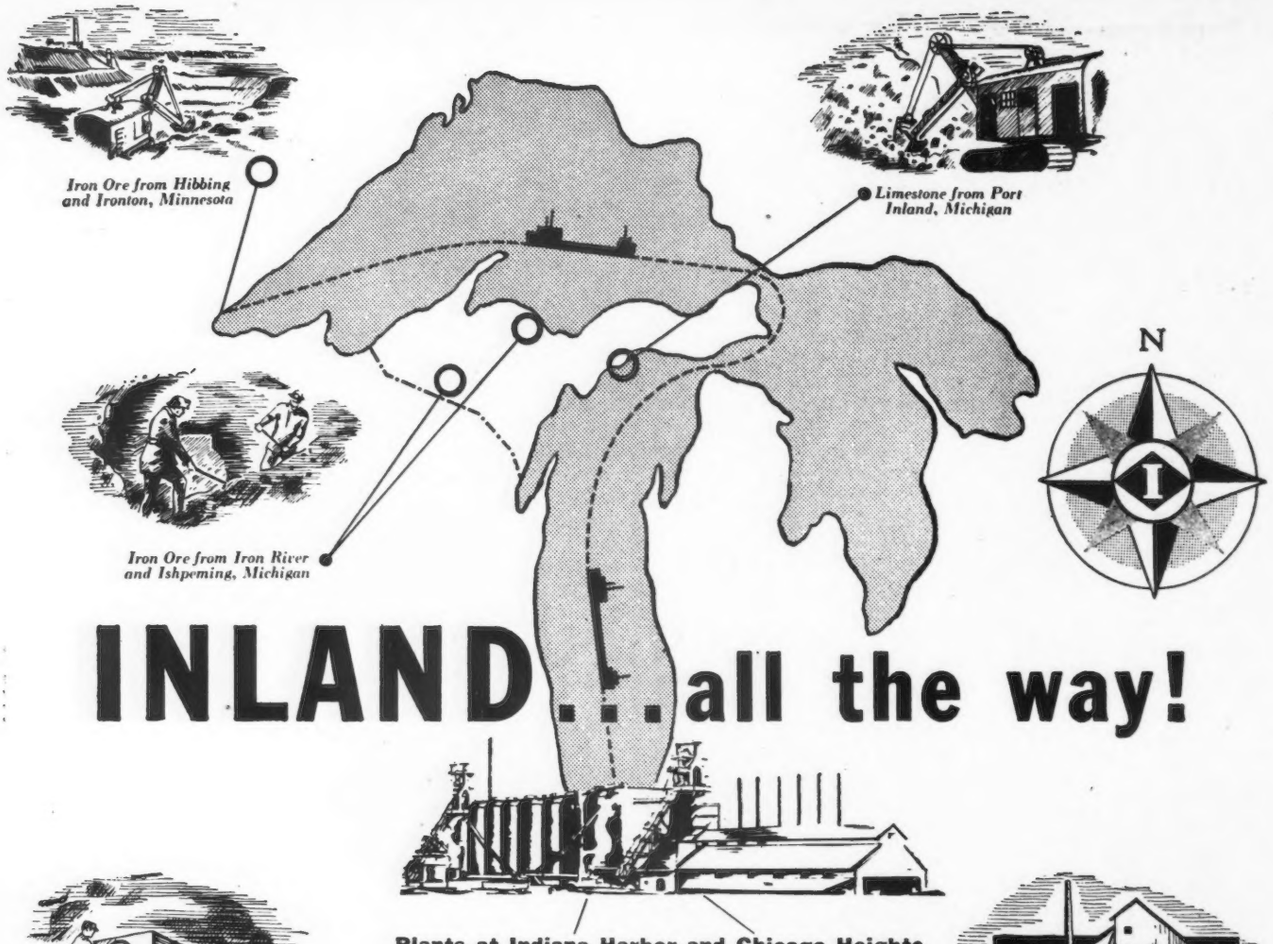
* Because of the current controversy concerning the role of wages and of productivity in price determination, many requests to reprint this editorial which first appeared in the issue of Jan. 31, 1946, have been received.





INLAND . . . all the way!

The making of steel comprises many elements and processes, among which the gathering of raw materials is of prime importance. The Inland map shows the many points from which we gather these raw materials in the Central States area.

The principal ingredient, iron ore, comes by Inland ore boats from the Mesabi and Cuyuna ranges in Minnesota and the Marquette and Menominee ranges in Michigan.

Port Inland furnishes limestone to serve as flux in the blast furnaces and open hearths. Because a ton of coke is required to make a ton of finished steel products, thousands of tons of coal arrive daily from Wheelwright, Kentucky.

Most significant, however, is the fact that Inland Steel owns the mines and quarries from which these raw materials are taken . . . a fact which makes it possible to control quality from the raw materials to the finished steel—ready for use. This complete control from mine to consumer means—that the steel you buy bearing the famous diamond trademark, is . . . INLAND ALL THE WAY!

As with all fabricating materials, the demand for Inland steel now exceeds the supply. However, we are building new mills and expanding facilities that, we sincerely hope, will improve our steel deliveries in the future and eventually enable us to offer you all of the Inland steel you may require.

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► A good bet is that a number of WAA surplus machine tools in long supply will soon be removed from the Clayton price formula to speed sales, also that more tools in good supply will be made available for export and foreign markets provided with sales lists. Scrapping of obsolete and worn-out items will be stepped up.

► Some automakers are using more expediters than they employed during the war. Express charges of one producer have multiplied five times. Use of air freight and chartered planes is common practice by harried purchasing men.

► The earth is becoming too small a place for Army Ordnance's guided-missile program. Development of rocket weapons has progressed to the point where Ordnance is seeking ocean bases from which to launch super long range missiles. A joint Army-Navy commission is now searching for a range where it will be possible to test rockets over a distance of 2000 miles.

► Nails are being offered in the New York black market for $8 a keg above the base and barbed wire for $10 a spool—both for export only.

► West Coast interests are trying to get a special low power rate for the government-owned aluminum reduction plant at Los Angeles, now out of production because it cannot be privately operated at a profit.

► A machine tool man will sit in the U. S. Senate next year. He is R. E. Flanders, president of Jones & Lamson, who last week won the Republican nomination for U. S. Senator from Vermont.

► Philips Laboratories of Holland report that they have experimentally proved a high efficiency refrigerator operating on the principle of the hot-air engine. Hot-air engines built experimentally during the war by Philips developed speeds up to 3000 rpm.

► Mining interests are expected to press for higher silver prices in the near future since their last request for $1.29 per oz. ended up in a 90.5¢ compromise in Congress. The silver users' committee of the Jewelers Association believes producers will seek $2.19 next time, but will fight the issue.

► Westinghouse engineers are now machining bearings from blocks of Lucite for detailed visual study of lubricant behavior. Oil colored with a red pigment is fed into the bearing to enable the engineer to see whether the seals are working properly, whether the oil passages are permitted a proper flow of lubricant and whether relief points are properly located.

► The Sol-A-Die process, developed at Solar Aircraft, makes possible the production of stage die patterns in less than half the time previously required. Patterns are constructed of beeswax and cheesecloth on the final pattern, and being flexible may be bent to the desired form of the intermediate stages.

► The Schori process of spraying plastic or metal powders through an oxypropane flame has found wide application in the plating industry for tank linings. The powdered material passes through the flame in a matter of milliseconds, too fast for actual melting to take place before contact with the object being sprayed.

► The repeated passing of the flame over the powder on the surface and the heat of the object sprayed combine to melt the powder into a continuous nonporous coating.

► Lack of food and coal is a serious obstacle to getting Japan back on her industrial feet. Most factories must make provision for time to hunt food; one steel company grants a 3-day food buying holiday every 10 days; another has shortened its work day for this purpose.

More machinery is needed for mining while more coal is needed to produce the machinery. Requirements of 2½ million metric tons of coal a month can't be met before spring of 1947.

► CPA Chief John D. Small states that while the ceiling is being reached on overall production due to a shortage of manpower, this production "can't give us a tremendous amount of additional stuff unless we get more productivity per manhour."

► European industrialists who were once forced to operate unwillingly under the Nazi yoke are also having trouble with low man-power output. Their labor force, it appears, was too well trained in the slow-down as a method of hampering production for the Nazis.

► The Norwegian government has set aside the equivalent of $6 million for preparatory work on a fully integrated steel plant with an initial annual capacity of 200,000 metric tons.

► A $20 million firm, the American Anglo-Transvaal Corp., has been formed by Ladenburg, Thalmann & Co. and Lazard Freres & Co. to expand mining and industrial activities in the Union of South Africa.

► Since most of the flooded areas of the Netherlands (once nearly 10 pct of the agricultural land) have been reclaimed from the sea, the Dutch are in critical need of farming equipment. Present needs include 2300 tractors, 50,000 ploughs and harrows, and 3 million shovels, spades and forks.

Triple Alloy

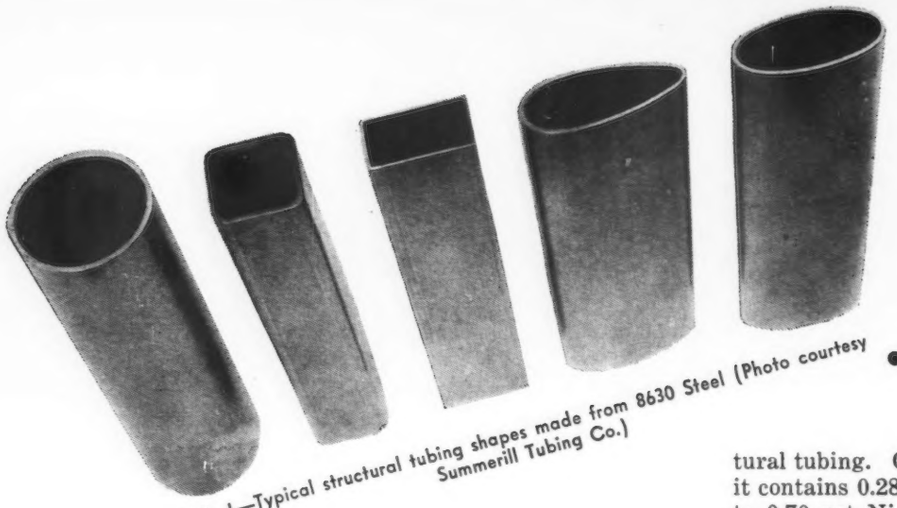


FIG. 1—Typical structural tubing shapes made from 8630 Steel (Photo courtesy Summerill Tubing Co.)

THE engineering value of alloy steel tubing as a material of construction is based upon its favorable strength-stiffness-weight relationships. As Wilson has pointed out in a recent summary[1], tubular sections, whether under compression, bending, or torsion loading, have the least weight for a given strength and stiffness. These factors have led to its adoption for many applications, among which can be mentioned structural frameworks of all kinds, shafting, axles, torque tubes and rollers. The aircraft industry, always acutely weight conscious, has been particularly attentive to the use of tubing for structural parts.

Strength is only one requirement. Satisfactory tubing material must be capable of being formed in many ways, by hot upsetting or flanging or by cold-forming operations such as bending, swaging, spinning, flanging tapering, expanding or beading. It must likewise be capable of assembly into complex structures by welding or brazing, or through the use of threaded or bolted joints. That these fabricating requirements can be met satisfactorily with alloy steels capable of developing exceptional mechanical properties as well, is something of an accomplishment.

Type 8630 steel, sired by the war, has done a consistently effective job with the aircraft industry and has become an improved standard material for structural tubing. One of the so-called "triple alloy" steels, it contains 0.28 to 0.33 pct C, 0.70 to 0.90 pct Mn, 0.40 to 0.70 pct Ni, 0.40 to 0.60 pct Cr, and 0.15 to 0.25 pct Mo.

One of the most generally informative tests applied to a steel to determine its capability for developing required levels of mechanical properties is the Jominy end-quench test. Fig. 2 reproduces results obtained by Jominy[2] on eight heats of 8630 steel, revealing that hardenability is satisfactory for tubing of moderate wall thickness. Of particular significance, however, is the fact that the hardenability band is relatively narrow, which indicates that response to heat treatment is uniformly consistent from one heat to another.

The triple alloy steel meets without difficulty the rather exacting requirements of the aircraft industry for high strength. Minimum tensile requirements for normalized and quenched and tempered tubing are listed in table I*. Simple normalizing, involving as it does air cooling of relatively thin-walled sections, induces internal stresses, in steels possessing hardenability characteristics such as shown in fig. 2, which operate to give low values for yield strength as measured by the tensile test. It has been found that a stress relieving treatment at 900°F after normalizing appreciably raises the yield strength of 8630 by relieving these internal stresses. Stress-strain recorder curves reflect this relief by altering from the gradual-bending type of curve to the relatively sharp knee type at the yield point. Data[3] indicating the quantitative amount of improvement in yield strength which can be achieved by the 900°F treatment are shown in table II. For the group normalized at 1650°F in table II, all stress-strain curves showed a smooth curve of gradually increasing elongation; for the group drawn at 900°F after normalizing, the stress-strain curves showed a definite break at yield preceded by slight elongation.

When a higher order of strength is required in the normalized condition, as listed in table III,** 8635 steel is supplied. This grade has a carbon content of 0.33 to 0.38 pct and a manganese range of 0.75 to 1.00 pct. Other elements are the same as for 8630. It will be

TABLE I

Minimum Mechanical Properties for 8630 Aircraft Tubing

Condition	Wall Thickness, In.	Tensile Strength, Psi	Yield Strength, Psi (0.2 Pct offset)	Elongation, Pct in 2 in.	
				Full Tube	Strip
Annealed	....	95,000[1]	.....	..	..
Normalized or stress-relieved	up to 0.035, incl.	95,000	75,000	10	5
Normalized or stress-relieved	over 0.035 to 0.188, incl.	95,000	75,000	12	7
Normalized or stress-relieved	over 0.188	90,000	70,000	15	10
Quenched and tempered	all walls	125,000	100,000	12	7
Quenched and tempered	all walls	150,000	135,000	10	6
Quenched and tempered	all walls	180,000	165,000	8	5

[1] This value is a maximum, all others are minimum values.

** These requirements for mechanical properties appear in the (1) Army-Navy Aeronautical Specification AN-T-15, dated May 14, 1945, for seamless tubing, and (2) Army-Navy Aeronautical Specification AN-T-33, dated May 15, 1945, for welded tubing. Similar requirements, with minor modifications appear in whole or in part in the (1) Aeronautical Materials Specification 6530B for seamless tubing, (2) Aeronautical Materials Specification 6550B for welded tubing, and (3) Aeronautical Materials Specification 6531 for heat treated seamless tubing.*

Structural Tubing

By C. M. SCHWITTER
Metallurgist, Development & Research Div., International Nickel Co., Inc., New York

Strength, formability, weldability and consistent hardenability are factors that have led to the adoption of 8630, one of the so-called triple alloy steels, tubing by the aircraft industry as a peacetime engineering material. The effect of heat treatment on physical properties of various sizes of tubing is discussed in this review, as well as results of weldability tests conducted under variable conditions.

noted by comparison of table I with table III that the higher carbon grade meets yield strength requirements 10,000 psi higher than 8630 without the necessity for downward adjustment of ductility requirements.

A chart of mechanical properties of quenched and tempered 8630 in tubing sizes varying in wall thickness from 0.120 to 0.035 in. is shown in fig. 3, as originally published by Williamson[4]. It is evident that yield strengths in excess of 200,000 psi can be developed with this steel in moderate wall thicknesses.

** *These requirements for mechanical properties appear in* (1) *Army-Navy Aeronautical Specification AN-T-22-2, and* (2) *Aeronautical Materials Specification* 6535*B* (*normalized condition only*).

The forming characteristics of 8630 steel have been the subject of much investigation by the aircraft industry. It has been generally conceded that the triple alloy steel tubing can be bent, swaged, flanged and subjected to various other cold forming operations just as readily as prewar standard tubing. Waisman and Snyder[5] in discussing difficulties with forming 8630 sheet early in the war suggest that cracking troubles may have been the result of a combination of unavoidable wartime conditions due to production pressure. Partial confirmation of this is revealed by the as-received microstructures presented in their article, which display characteristics which might be identified as fine laminations, thin inclusion stringers or possibly fine cracks which cannot be considered representative of good quality sheet.

The authors, using the lowest ratio of bend radius R to sheet thickness t as a measure of the severity of the cold forming operation, present the data shown in table IV and conclude that normalizing followed by a subcritical anneal is the most effective treatment for producing maximum formability in flanging, joggling and cupping operations. Dead annealing is considered effective for flanging or joggling, but not for cupping operations. The authors also conclude that best forming characteristics are obtained from material having no banded microstructure and containing uniformly spheroidized carbides, conditions which may be produced by rapid air cooling after normalizing followed by a subcritical anneal.

The welding characteristics of 8630 steel in sheet and tubing form have also been investigated extensively. Williamson[4] reports that fundamental tests at one research institution indicate that the 8600 steels are less susceptible to weld cracking than prewar tubing even when the 8600 series steels have a higher carbon content, and suggests that this may permit use of tubing with higher strength as a result of raised carbon content without impairing welding characteristics. Results of tensile tests reported by Williamson on three sizes of butt-welded 8630 tubing are

TABLE II

Effect of Drawing After Normalizing of Type 8630 Steel Tubing

Tube Size, In.	Normalized at 1650° F			Drawn at 900° F, After Normalizing		
	Yield Strength, Psi	Ultimate Strength, Psi	Elongation, Pct	Yield Strength, Psi	Ultimate Strength, Psi	Elongation, Pct
½ x 0.037	56,950*	111,600*	20*	82,420**	100,690**	22**
1 x 0.063	60,410**	107,900**	25**	80,300**	100,500**	26**
2 x 0.25	60,550*	95,500*	43*	68,900*	93,150*	27*

* Average of two determinations.
** Average of four determinations.

TABLE III

Minimum Mechanical Properties for 8635 Aircraft Seamless Tubing

Condition	Wall Thickness, In.	Tensile Strength, Psi	Yield Strength, Psi (0.2 Pct offset)	Elongation, Pct in 2 in.	
				Full Tube	Strip
Annealed	....	100,000[1]	.....	..	..
Normalized or stress-relieved	up to 0.188 incl.	100,000	85,000	12	7
Normalized or stress-relieved	over 0.188	95,000	80,000	15	10
Quenched and tempered	all walls	125,000	100,000	12	7
Quenched and tempered	all walls	150,000	135,000	10	6
Quenched and tempered	all walls	180,000	165,000	8	5

[1] This value is a maximum, all others are minimum values.

TABLE IV

Effect of Several Heat Treatments on Critical Bend Radius and Physical Properties of 8630 Steel Sheet, Mill Normalized, 0.093 in. Thick

	As Received	Normalized[1]	Sub-Critical Anneal[2]	Dead Annealed[3]	Normalized Plus Sub-Critical Anneal[4]
Lowest R/t ratio for successful flanging;					
Sheared after treatment	4.00	2.35	2.35	1.0	1.65
Sheared and sandblasted after treatment	2.0	1.65	2.0	0.70	1.0
Treated and sandblasted after shearing	....	1.0	1.0	0.65	0.35
Tensile strength, Psi	102,000	....	92,000	79,500	....
Yield strength, Psi	77,500	....	72,000	52,500	....
Elongation in 2 in., Pct					
Longitudinal	19.5	....	20.5	....	....
Transverse	17	....	17.5	....	....
Hardness, Rockwell B	94 to 96	97 to 98	90 to 92	85 to 87	88 to 89

[1] Normalized at 1700°F.
[2] Subcritical anneal at 1250°F for 2 hr.
[3] Dead annealed by heating to 1550°F and furnace cooled at 50°F per hour or less.
[4] Normalized at 1700°F and given subcritical anneal at 1250°F for 2 hr.

TABLE V

Results of Tensile Tests of Buttwelded Joints of 8630 Steel Tubing

Tubing Size, In.	Before Welding		After Welding	
	Yield Strength, Psi	Ultimate Strength, Psi	Yield Strength, Psi	Ultimate Strength, Psi
1⅛ OD x 0.120 wall	102,000	119,000	103,000	105,000
¾ OD x 0.065 wall	116,000	125,000	108,000	120,000
½ OD x 0.035 wall	108,000	116,000	109,500	111,000

shown in table V to illustrate that very little change in either yield or ultimate strength occurs as a result of welding. Rockwell hardness surveys across the welds indicated a maximum hardness of 29 Rc for ¾ in. diam tubing with 0.065 in. wall thickness and 25 Rc for 1⅛ in. diam tubing with 0.120 in. wall. Hardness of the base tubing was about 22 Rc.

Lytle and Koopman[6] made tests on a heat comprising normalized sheets 0.049 in. and 0.083 in. thick, using gas welding techniques employing three types of welding rods conforming generally to Types C, B and A of U. S. Navy Specifications. They examined flowing quality, hardness, tensile strength and bend ductility after welding. Maximum hardness in the heat-affected-zone approximated 30 to 32 Rc for base material with a hardness of about 20 Rc. The investigators concluded that weldability of 8630 is entirely satisfactory.

TABLE VI

Tests on Welded Tubing of 8630 Steel

Size, In.	Weld	Rod	Heat Treated	Ultimate Strength, Psi	Elongation in 2 In., Pct	Fracture
1 x 0.036	Arc	Low carbon	Yes	168,000	.....	Both sides of bead
	Gas	Low carbon	No	113,000	6.5	In base metal
	Gas	Low carbon	Yes	173,500	2.5	In weld and base metal
	Gas	High tensile	No	111,000	7.5	In base metal
	Gas	High tensile	Yes	192,500	2	Diagonal, through base metal
1 x 0.065	Arc	Low carbon	No	113,000	6	In base metal
	Arc	Low carbon	Yes	176,000	2.5	Part in sound weld
	Arc	High tensile	No	109,000	8	In base metal
	Arc	High tensile	Yes	150,500	2	Through blow holes in weld
	Gas	Low carbon	No	113,500	8	In base metal
	Gas	Low carbon	Yes	142,000	2.5	In sound weld
	Gas	High tensile	No	107,000	6	In base metal
	Gas	High tensile	Yes	193,000	2	In base metal
2 x 0.25	Arc	Heavily coated	.....	91,700	.....	In weld {A few medium
	Arc	Reverse polarity	.....	99,500	.....	In weld { blowholes
	Gas	Low carbon	.....	81,300	.....	In sound weld
	Gas	High tensile	.....	90,800	.....	In sound weld

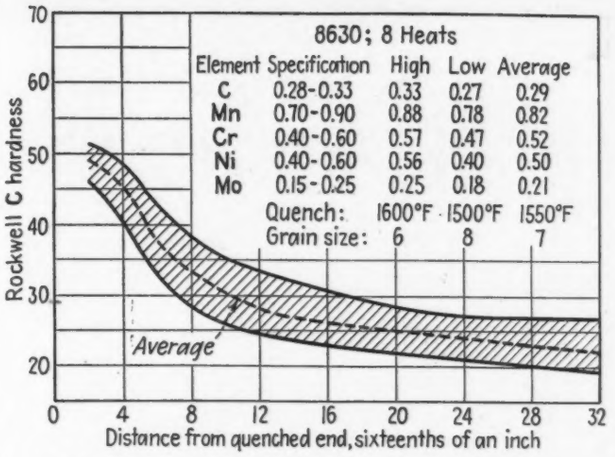
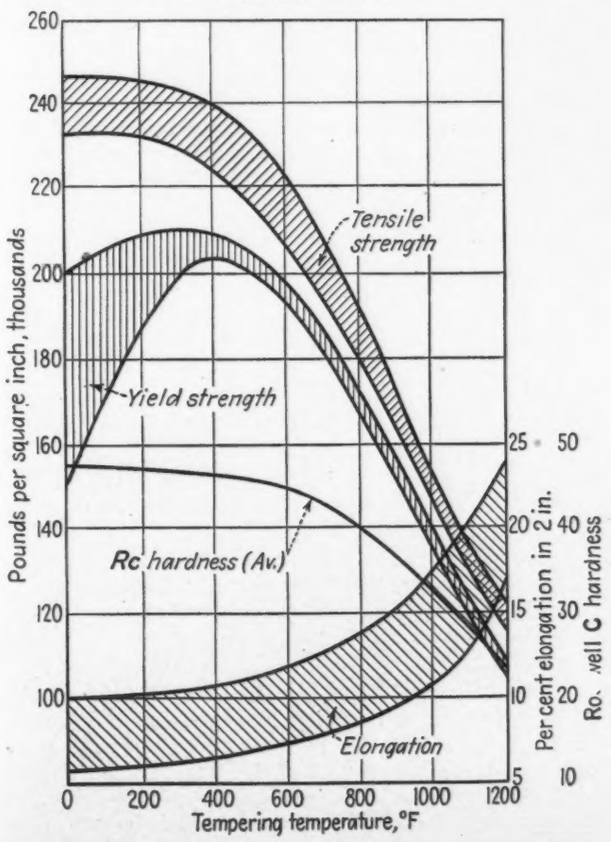


FIG. 2—End quench hardenability curve for 8630 steel.[2]

The results of extensive weldability tests on 8630 were reported by Morse Hill[3] in describing investigations by various aircraft fabricators. Comments from the companies involved in the program indicated that 8630 melts somewhat faster and has a cleaner puddle of molten metal, especially in gas welding, that it has less tendency toward weld cracking and that hardness gradients and total hardness variation are often less steep in 8630 than in prewar standard tubing.

Structural tubing of 8630 steel is available in round, rectangular, square, streamline, and oval sections in a range of sizes and wall thicknesses as well as several tensile strength grades. In fig. 1, from an article by Wilson[1] are shown the different tubular sections

FIG. 3—Mechanical properties of quenched and tempered 8630 tubing in sizes ranging from 1½ in. OD x 0.12 in. wall to ½ in. OD x 0.035 in. wall.



supplied to Army-Navy Aeronautical Specification AN-T-15 covering 8630 nickel-chromium-molybdenum steel in a number of physical conditions. Some idea of the variety of sizes can be gained from the standard size list for round airframe tubing in which sections range from 3/16 in. OD and 0.022 in. wall up to 3 in OD and 0.250 in. wall.

Aircraft tubing made to specification AN-T-15 is generally used in the condition as furnished by the tube maker and is cut, bent, fitted, and welded into assemblies by the fabricator. When high strength is needed, the 8630 steel tubing is oil quenched from about 1625°F and tempered suitably to meet the strength grades of 125,000, 150,000, 180,000, and 200,000 psi ultimate tensile strength. Fig. 4 is a

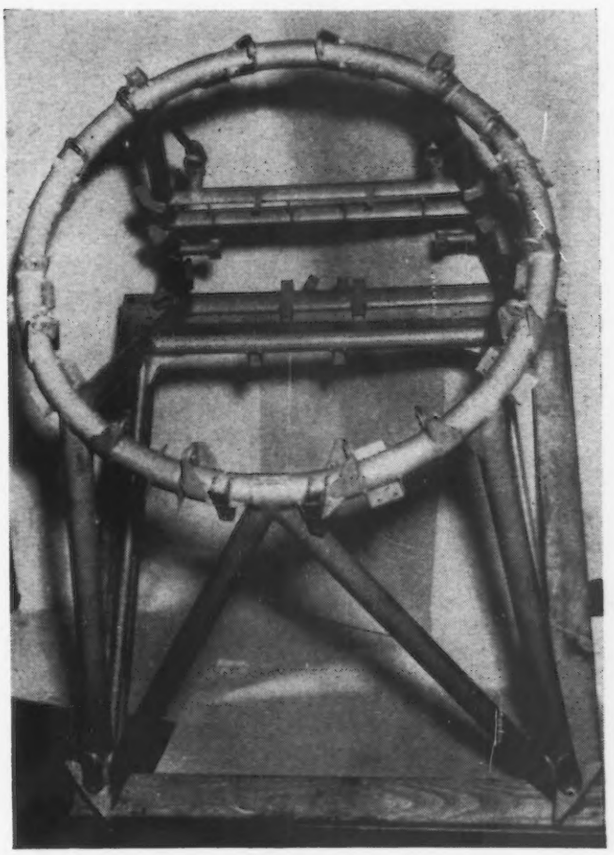


FIG. 4—Aircraft engine mount fabricated from 8630 tubing (Courtesy Summerill Tubing Co.)

photograph of an airplane engine mount assembly made from 8630 tubing. The extraordinary amount of welding is obvious. The adoption of 8630 for this kind of work has been amply justified in practice by virtue of its satisfactory hardenability, uniform response to heat treatment, and excellent weldability.

References

[1] R. L. Wilson, "Nickel Alloy Steel Seamless Tubes," Nickel Alloy Steels (2nd edition—1946), Section 2, Data Sheet D.
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The Statistical Approach

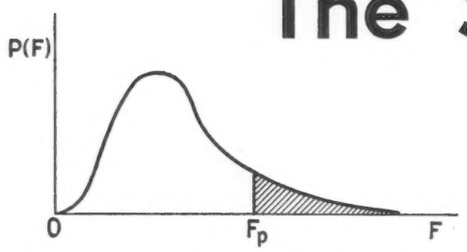

FIG. 1—Graphical illustration of mathematical relationship

$$P = \int_{F_P}^{\infty} \phi\,(n_1, n_2, F)\, d\,F$$

o o o

By ARTHUR LESSER, JR.
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o o o

LARGELY through the efforts of various governmental agencies, applied statistics received a tremendous impetus during the war. It seems safe to say that competitive postwar industry, recognizing the contribution that statistical methods can make to manufacturing economy, will broaden their use. With a large share of the wartime emphasis focused on turning out vast quantities of war materials, it is not surprising that attention was given to techniques that would improve both quality and quantity. Much less emphasized in this country, however, were other equally powerful statistical techniques which, when applied in industrial research, become important practical tools for analytical purposes.

It has been the time honored practice in research work to endeavor to hold all variables substantially constant except the one being tested. Although this methodology is and has been used very successfully, it has some shortcomings. Not the least of these is the large number of experiments that usually must be done when it is desirable to determine whether more than one factor is responsible for the variation in test results. For instance, consider a fundamental research problem in powder metallurgy, from which field all illustrative examples in this paper are to be taken. The objectives of the experimenter are to determine whether (1) the particle size of a small percentage of graphite added to iron powder, (2) the amounts of the graphite added, and (3) the pressures under which the specimens are to be compacted, will importantly affect the tensile strength of the finished steel specimens (in this experiment sintering time and temperature are not varied). In addition, the experimenter would probably be interested to learn whether the important effects observed in tensile strength are due to each of the three factors operating singly, or two operating jointly, or perhaps even all three operating together. Without going any further it is evident that the number of experiments, that must be run by varying only one factor at a time, is very large. Yet the problem that is posed here can be solved by one experiment designed according to statistical methods that will be demonstrated later in a similar case.

Another frequent shortcoming is the expense that may be involved in attempting to hold substantially constant the causes of disturbing variation in an experiment. This idea of reducing variation is also extremely important when employing statistical methods in designing experiments but in this latter case it is possible to discriminate between causes of variation which should be given attention and those which consciously should be disregarded. Furthermore, in respect to the causes of variation to which attention is to be given, it is possible to determine how much effort should be expended on diminishing their magnitude.

It would be unfortunate to give the impression that the statistical design of experiments is a panacea for all research problems. It too has its limitations. Experimental design can be used most effectively in the testing of hypotheses in the initial stages of fundamental research or development work or in conjunction with other statistical techniques in the more advanced stages of research. In general, the statistical design of experiments can be said to lay the basis for further research, for it rules out test factors that are not statistically significant permitting emphasis to be put on those that are statistically significant. In order to appreciate fully the detailed experiments that follow, a short resume of the background leading to the experiments is helpful.

The Office of Production Research and Development commissioned the Powder Metallurgy Laboratory of Stevens Institute of Technology to inquire into "The effect of particle size of iron powder on the physical properties of the powder and of iron

TABLE I

Length Shrinkage of Various Powder Fractions*

Compacting Pressures, Tons per sq in.	Powder Fractions						Totals
	B	C	D	E	F	G	
25	1.47	1.59	1.78	1.51	1.90	2.32	10.57
50	1.15	1.38	1.50	1.38	1.44	1.90	8.75
Totals	2.62	2.97	3.28	2.89	3.34	4.22	19.32

* Percentage multiplied by 100.

In Industrial Research . . .

Based on statistical experiments conducted during the war with regard to quality control and inspection, the author outlines in this article a procedure equally satisfactory for postwar industrial research. Although the article utilizes data obtained from work conducted in the field of powder metallurgy, the mathematical technique herein described is equally applicable to other phases of the metalworking industry as an important practical tool for analytical purposes.

powder compacts."* The iron powder selected for the series of experiments, which were statistically designed, was divided into powder fractions by sieving and air classifying for the subsieve fractions. For instance, the size of particles in fraction B was roughly between 105 and 149 microns. Successive fractions through fraction G contained finer particles. The following standard laboratory conditions were used in each experiment; (1) the sintering time was 30 min, (2) the sintering temperature was 2012°F, and (3) the sintering atmosphere was hydrogen, deoxidized and dried.

In this detailed experiment, the objective is to determine the percentage shrinkage in length, after sintering, of ¾-in. cylindrical specimens. Each specimen was prepared by using 30 g of powder. The questions to which answers were desired were: (1) "Does a change in compacting pressures significantly affect the sintered length?" and (2) "Do changes in powder fractions significantly affect sintered length?"

* *Report No. W-223.*

The first problem was to obtain samples that were as homogeneous as possible. The powder fractions were separately well mixed on tables. The powder in each fraction was arranged in the shape of a pie which was divided roughly into six segments. To each segment was assigned a letter. Then squares of cardboard were lettered corresponding to the segments. These squares were placed in a hat and drawn out by chance. The square corresponding to segment B was pulled first and six specimens were extracted from this well mixed segment for testing. The same was done for the remaining segments. The next step was to assign a letter to each specimen from a segment. Again a drawing was made to determine in what order the specimens were to be weighed and compacted. The six specimens were compacted, three at 25 tons per sq in. and three at 50 tons per sq in., in the random order in which the squares were drawn from the hat. This process of randomization was employed to remove bias tendencies either by the experimenter or by the apparatus used. Randomization is one of the vital elements in this type of experimentation.

Three electric furnaces were used in sintering the compacts. To avoid bias due to furnaces, the selection of furnaces for each specimen was left to chance. The place in the furnace for each specimen was randomized for the same reason. In short, randomization was used wherever personal or processing bias seemed likely to enter in. Table I shows the percentage shrinkage in length multiplied by a constant, 100, for arithmetic convenience.

Each value given is an average of three. It was unnecessary, from the point of view of this test, to triplicate. One specimen for each fraction and each pressure would suffice because of the replication inherent in the experiment. Consider the rows of the table, for instance. In each row, each powder fraction is acted upon by a constant condition, pressure, giving six pressure replications. In the columns, the powder fraction is held constant and the pressure is varied giving duplication for powder fractions. The economy is apparent. Twelve specimens need be tested instead of 36. It should be stated, however, that in general the more data that is obtained on which to base an inference the more reliance can be placed on the inference.

To answer the two questions asked previously in this discussion, the statistical analysis of variance is used. The principles involved are these; the total variation of all of the values in the table about their grand mean must be explained. In designing the experiment, the experimenter adopted the hypotheses that most of the variation is due to two factors; (1) powder fractions and (2) compacting pressures. In order to test these hypotheses, the variation of each of these about the grand mean must be determined.

The measure of total variation used is the sum of the squared deviations of each value from the grand

TABLE II

Analysis of Variance

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square
Powder fractions	0.77	5	0.15
Pressures	0.27	1	0.27
Residual or experimental error	0.03	5	0.006
Total	1.07	11	

TABLE III

Tensile Strengths of Various Powder Fractions*

Pressure: 25 tons per sq in.

Furnaces	Powder Fractions B	C	D	E	F	G	Totals
No. 1	11.3	12.2	12.9	12.1	16.9	14.3	79.7
No. 5	11.9	10.4	12.4	13.9	14.9	15.0	78.5
No. 6	10.0	9.9	11.3	13.3	12.4	13.8	70.7
Totals	33.2	32.5	36.6	39.3	44.2	43.1	228.9

Pressure: 50 tons per sq in.

Furnaces	Powder Fractions B	C	D	E	F	G	Totals
No. 1	21.1	21.1	21.7	24.4	23.6	23.5	135.4
No. 5	21.3	21.4	22.0	24.1	25.5	22.1	136.4
No. 6	18.8	19.5	21.6	23.8	23.3	20.5	127.5
Totals	61.2	62.0	65.3	72.3	72.4	66.1	399.3

* Values given in pounds per sq in., divided by 1000.

arithmetic mean. This is cumbersome to handle so the following algebraic equivalent is used;

$$\text{Total variation} = \Sigma X^2 - \frac{(\Sigma X)^2}{n}$$

where X is an observation or average of observations,

n is the total number of observations or averages, and

$\frac{(\Sigma X)^2}{n}$ is the correction factor used in each instance.

The variation due to powder fractions may be computed by squaring the total of each column, dividing by the number of values in each column, summing up the average of these squared terms and subtracting the correction factor. The variation due to pressures is computed in the same way with the row totals used instead of the column totals. The computations follow:

Total variation:

$$\Sigma = (1.47)^2 + (1.15)^2 + (1.59)^2 + **** + (2.32)^2 + (1.90)^2 = 32.18$$

$$\frac{(\Sigma X)^2}{n} = \frac{(19.32)^2}{12} = 31.11$$

Total variation = 32.18 − 31.11 = .1.07

Variation due to pressure

$$\Sigma X_R^2 = \frac{1}{6}\left[(10.57)^2 + (8.75)^2\right] = 31.38$$

Variation due to pressure = 31.38 − 31.11 = .027; where X_R is the average for the row, hence the necessity of dividing by 6.

Variation due to powder fractions

$$\Sigma X_C^2 = \frac{1}{2}\left[(2.62)^2 + (2.97)^2 + **** + (4.22)^2\right] = 31.88$$

Variation due to powder fractions = 31.88 − 31.11 = 0.77; where X_C is the average for the column.

TABLE IV

Tensile Strength Values Obtained from Table III*

Pressures, Tons per sq in.	Powder Fractions B	C	D	E	F	G	Totals
25	33.2	32.5	36.6	39.3	44.2	43.1	228.9
50	61.2	62.0	65.3	72.3	72.4	66.1	399.3
Totals	94.4	94.5	101.9	111.6	116.6	109.2	628.2

* Values given in pounds per sq in., divided by 1000.

The analysis of variance table is given in table II. The degrees of freedom, the number of independent variates, are one less than the number of observations or averages, as in this case. The degrees of freedom for experimental error may be found by difference. The mean square, or variance, is found in each case by dividing the sum of squares by the degrees of freedom. The last step is an evaluation of the data in the table.

The mean square of the experimental error is an independent estimate of the variance of the parent population, from which the samples were taken, arising from presumably random causes only, due to randomization. The variances due to pressures and to powder fractions are also independent estimates of the variance of the parent population. A comparison is then made, for instance, between the population estimate of the variance due to pressures and the population estimate of the variance due to random or chance causes.

Steps Followed in Mathematical Solution

In simplified form, it can be said that if the variance due to pressures is no larger than that due to random causes, it is reasonable to suppose that random causes were responsible for the variation in shrinkage in length and not pressures. Although the principle involved is not difficult to understand, applying the principle is not so simple because, as will be noted from table II, variance is dependent on the number of degrees of freedom in each case as well as on the vagaries of random sampling. The steps taken in arriving at a practical solution will be briefly outlined so that the reasoning behind the mathematical solution may be understood.

In the first place, the assumption is made that there is no difference between the variation in shrinkage due to pressures and the variation in shrinkage due to random causes. This is known as the null hypothesis. The objective is to make a correct decision, either to accept or reject this hypothesis. This is done by comparing the experimental results with the behavior of samples drawn under known conditions.

Secondly, to arrive at the known conditions it was necessary to determine the equation of the theoretical frequency distribution of the quotient of the variances that would be obtained by drawing at random from a normal population a large number of samples of any two given degrees of freedom or independent variates. There is one less degree of freedom than the number of variates because the use of the arithmetic mean in determining the estimated variance of the population removes one degree of independence.

The third step is to decide what risk the experimenter will take in rejecting the null hypothesis when it is true. It is evident that when an attempt is made to draw an inference about the character-

istics of the whole, the parent population, from a pair of samples of given sizes, some degree of risk, known as the coefficient of risk, must be taken that the inference drawn is incorrect. In order to obtain certainty it would be necessary to take an infinite number of sample pairs, or expressed otherwise, to examine the entire population which is practically impossible.

The fourth step is to determine the critical value of the quotient of the variances, symbolized by F, from the known conditions for the given degrees of freedom and for the desired coefficient of risk. The mathematical relationship is:

$$P = \int_{F_P}^{\infty} \phi\,(n_1, n_2, F)\,a$$

where n_1 and n_2 are the respective degrees of freedom of the samples, F is the quotient of the variances, and P is the coefficient of risk or probability. Graphically, this can be illustrated as shown in Fig. 1.

The final step is to determine the value of the statistic F from the sample data, which will be assumed to have been drawn from a normal population, and to compare this computed value with the critical value, F_P, determined from the known conditions in the preceding step. If the computed value of F is greater than the critical value F_P, then the null hypothesis will be rejected. If the risk coefficient, P, referred to in experimental design as the level of significance, is taken as 5 pct, in one chance out of 20 it will be incorrect in rejecting the null hypothesis for, as indicated in the diagram, random causes can one time in 20 produce a higher value of F. A stricter level of significance may be used, such as 1 pct. Tables of F are available for both these levels of significance.[4, 5, 8, 10] Tables of $z = \frac{1}{2}\,log_e F$ are also available.[3, 7, 11]

Returning to the problem, the computations follow:

For powder fractions, $F = \dfrac{0.15}{0.006} = 25.$

From the F table for 1 pct level of significance for 5 and 5 degrees of freedom, $F_{0.01} = 10.97$.

For pressures, $F = \dfrac{0.27}{0.006} = 45.$

From the F table again for 1 pct and for 1 and 5 degrees of freedom, $F_{0.01} = 16.26$.

Therefore in answering the questions of whether powder fractions and compacting pressures significantly affect sintered lengths, it can be said that if these factors did not affect sintered length there would be less than one chance in 100 of observing the result obtained. The probability is so small that it seems preferable to believe that both powder fractions and compacting pressures do significantly affect shrinkage. It might be added that the larger the computed value of F, the greater the reliability of the inference.

A more elaborate experiment, which will illustrate further potentialities of this methodology, was designed to furnish data on the tensile strength of specimens compacted at different pressures and prepared from different powder fractions.

In previous experimentation, it was noted that occasionally tensile strengths of presumably identical specimens were obtained that varied among themselves more than the presumption seemed to warrant. It seemed that this variation was too large to be accounted for by sampling variation alone and therefore consideration was given to other factors that might contribute to this variation. After some thought it was decided that at least a part of this variation might be due to the fact that the tensile specimens were frequently sintered in different electric furnaces.

TABLE V

Tensile Strength Values Obtained from Table III*

Furnaces	Powder Fractions B	C	D	E	F	G	Totals
No. 1	32.4	33.3	34.6	36.5	40.5	37.8	215.1
No. 5	33.2	31.8	34.4	38.0	40.4	37.1	214.9
No. 6	28.8	29.4	32.9	37.1	35.7	34.3	198.2
Totals	94.4	94.5	101.9	111.6	116.6	109.2	628.2

* Values given in pounds per sq in., divided by 1000.

Checking Apparent Discrepancies

Three methods were considered, varying in efficiency, to test this hypothesis. One was to sinter all specimens in one furnace. The difficulty here was that it would have been necessary to repeat the sintering operation six times. This would take well over 3 hr including cooling times and in addition might introduce further variation due to the six runs that would be necessary. The second method was to use more than one furnace and attempt to regulate them with great precision so that they would not materially differ from each other. This would also be a time-consuming and troublesome operation which would have to be done without knowing whether or not it was worth the effort. A third procedure was to use statistical methods in designing an experiment to isolate the importance of variation in tensile strength due to furnaces.

Of the three methods suggested, only the third promised to answer the question regarding the significance of furnaces. The other two undoubtedly would cut the experimental error if variation among furnaces proved to be important. But whether different furnaces did affect tensile strengths still would not be known. In order to obtain this basic information, it was decided to use three furnaces necessitating only two runs which were randomized. The only restriction on the randomization was that each specimen in a triplicated group had to be as-

TABLE VI

Analysis of Variance

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significant
Powder fractions	71.24	5	14.25	15.15	Yes (1 pct)
Pressures	806.52	1	806.52	858.00	Yes (1 pct)
Furnaces	15.64	2	7.82	8.32	Yes (1 pct)
Residual or experimental error	25.34	27	0.94		
Total	918.74	35			

TABLE VII

Analysis of Variance

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significant
Powder fractions	71.24	5	14.25	10.01	Yes (1 pct)
Pressures	806.52	1	806.52	572.00	Yes (1 pct)
Residual or experimental error	40.98	29	1.41		
Total	918.74	35			

signed to each furnace. Of course, the randomizing process was used wherever required as explained in the previous experiment. The tensile strengths in pounds per square inch, divided by 1000 for arithmetic convenience, of all the specimens, are shown in table III.

It will be noted that all specimens in the upper half of table III were compacted at the uniform pressure of 25 tons per sq in. and in the lower half at 50 tons per sq in.

For analytical purposes two more tables, IV and V, were prepared from table III by combining values. For instance, in table V the sum of 32.4 for fraction B and furnace No. 1 was obtained by adding the tensile strengths of the two specimens, 11.3 + 21.1, in table III.

A few remarks will be made on the computations, which should be done on a machine. The sum of squares for the total variation is obtained from table III. The computations using the data in tables IV and V are made in each case just as if each were a self contained experiment, with the caution that each figure in tables IV and V is a total of three and two tensile strengths respectively and should be averaged in the computations. The composite analysis of variance is given in table VI.

It will be noted that in each case the variable selected has a significant effect on tensile strength. Now that it is known that variation among furnaces is statistically significant, it is worth while from a practical point of view to determine if the variation introduced by furnaces is great enough to outweigh the effect of powder fractions and pressures. If it is large enough, then there probably need be little concern with respect to powder fractions or pressures or both because it can be assumed that in practice more than one furnace would be used. Table VII indicates the answer to such a query. In this table, variation due to furnaces has been combined with the experimental error and the question of significance is related to this variance.

With powder fractions and pressures still significant, it can be concluded that these are important factors in tensile strength irrespective of furnace variation.

TABLE VIII

Analysis of Variance

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square
Powder fractions	71.24	5	14.25
Pressures	806.52	1	806.52
Experimental error or interaction	8.69	5	1.74
Total	886.45	11	

A further unique place that this type of experimental design fills is that it can tell the experimenter if there is any joint reaction, called interaction, between two or more variables being tested. For instance, again referring to the tensile strength experiment, the experimenter would probably be interested to know if the variation in pressure reacted differently on the powders of different finenesses. This can be determined by analyzing table IV as if it were an independent experiment and then comparing the interaction term of powder fractions and pressures with the residual error of the entire experiment. The analysis of variance appears in table VIII.

In practice, if the error term is relatively large, it is sometimes considered as an interaction between the two variables, provided that the powder fractions respond somewhat differently in absolute amounts when subjected to different pressures. An examination of table IV indicates that there may be some basis for this suspicion, because it will be noted that the fractions did not respond to the same extent under the two pressures. The differential response, however, may be due to sampling variation alone, which fact will be determined by the usual significance test. This is done in table IX which incorporates in table VI the interaction term obtained from table VIII.

It will be noted that the overall experimental error has been diminished by the interaction term because the latter had previously been included as part of the overall experimental error. It is evident that the interaction is not significant when compared to the experimental error even on the looser 5 pct level of significance. The magnitudes of the computed *F* ratios have changed slightly because of the change in the mean square of the error term due to the decrease in its number of degrees of freedom.

In basic research, the value of determining an interaction effect is self evident. It can also be determined by varying one factor at a time and later another factor but the effort may be prodigious and perhaps not as conclusive as by this simple method.

The virtues of this technique of experimental design may be summarized as follows: (1) The experimental results can be evaluated objectively, which may not be possible by other means; (2) the number of samples necessary can usually be objectively determined; (3) the importance of the interaction of the variables under test can be objectively determined; (4) economy in testing may frequently be achieved by cutting down the number of specimens without vitiating the conclusions; (5) by planning experiments in accordance with statistical methods, much waste of time and effort may be avoided; and (6) it may be unnecessary to expend time and money in refining the experimental procedure.

There are other experimental designs using the analysis of variance than those illustrated and there are other statistical methods that may be used in designing experiments.

There are statistical techniques that are useful in connection with the interpretation of results of experimental data. Just as it is the primary purpose of experimental work to draw correct inferences, in much the same way it is the role of certain statistical techniques to aid in drawing the proper inferences.

Reference may be made at the end of this paper to the bibliography dealing particularly with experimental design and statistical methods that can be advantageously used in the interpretation of results.

The process of randomization in research and development work can be fruitfully used to avoid bias without employing statistical techniques. As a cautionary note, it is dangerous to assume randomization when statistically interpreting experimental results.

Variations Among Samples Inevitable

The research worker should appreciate the fact that variation among samples, even from a homogeneous lot, is to be expected. Statistical techniques are designed to take this fact into consideration.

Caution is always necessary in evaluating the statistical conclusions because statistical significance does not always mean technical significance and vice versa. It should, however, be the aim in experimental design to equate, as far as possible, statistical and technical significance to overcome this difficulty.

The elaborate technique suggested cannot be used to advantage in routine tests on the floor of the plant. These problems of control can usually be better handled by statistical quality control techniques.

It is worth emphasizing again that the analysis of variance technique in experimental design will not solve all research problems nor can it be applied in all instances. It will be noted, for instance, that in the examples cited that the statistical significance of powder fractions was determined, not the statistical significance of particle size, because particle size as well as shape probably contributed to the significance. The importance of particle shape must be appraised by other methods.

Finally, where the statistical design of experiments can be appropriately applied both in research and development and is not now used, a powerful tool is being neglected.

TABLE IX

Analysis of Variance

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significant
Powder fractions	71.24	5	14.25	18.75	Yes (1 pct)
Pressures	806.52	1	806.52	1060.00	Yes (1 pct)
Interaction (Powder fractions and pressures)	8.69	5	1.74	2.29	No (5 pct)
Furnaces	15.64	2	7.82	10.28	Yes (1 pct)
Residual or experimental error	16.65	22	0.76		
Total	918.74	35			

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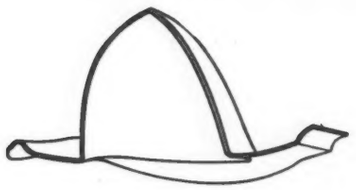
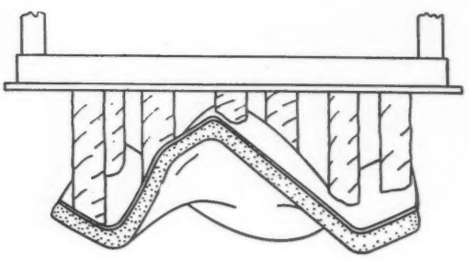
Lucite Models Solve Bearing Problems

MACHINED from blocks of Lucite, experimental machine bearings are now being made by Westinghouse engineers for detailed visual study of lubricant behavior. Oil, colored with a red pigment, is fed into the bearing model while the shaft is rotated either by handcrank or electric motor. The engineer is thus enabled to see whether the seals are working properly, whether the oil passages are permitting a proper flow of lubricant, and whether the relief points are located properly. All of these points were formerly determined by trial and error, and by elaborate mathematical calculations.

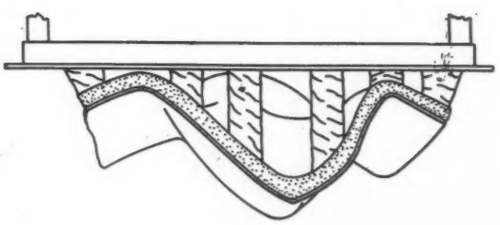


• *Trim the wax pattern*

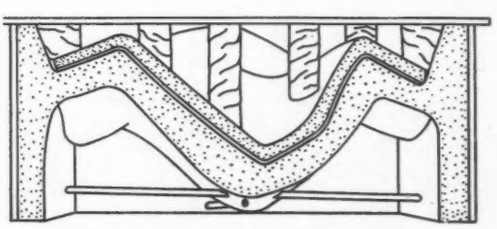
• *Unfold it to the desired stage*



• *Bolster in desired position, apply slip coat and 1 to 2 in. of plaster of paris backing*



• *Invert the backed pattern and bolster*



• *Surround with form boards and pour SOL-A-DIE plaster pattern*

FIG. 1—The five steps in making a pattern by the Sol-A-Die process, using a flexible matrix composed of beeswax and cheesecloth built up on the final pattern.

Low Cost Patterns For Multi-Stage Dies

The technique of building patterns for dies for the short run production of irregularly shaped parts by means of the patented Sol-A-Die process is described herein. Patterns are constructed of beeswax and cheesecloth, on the final pattern, and being flexible, may be bent to the desired form of the intermediate stages.

o o o

By R. RAYMOND KAY
Southern California Editor

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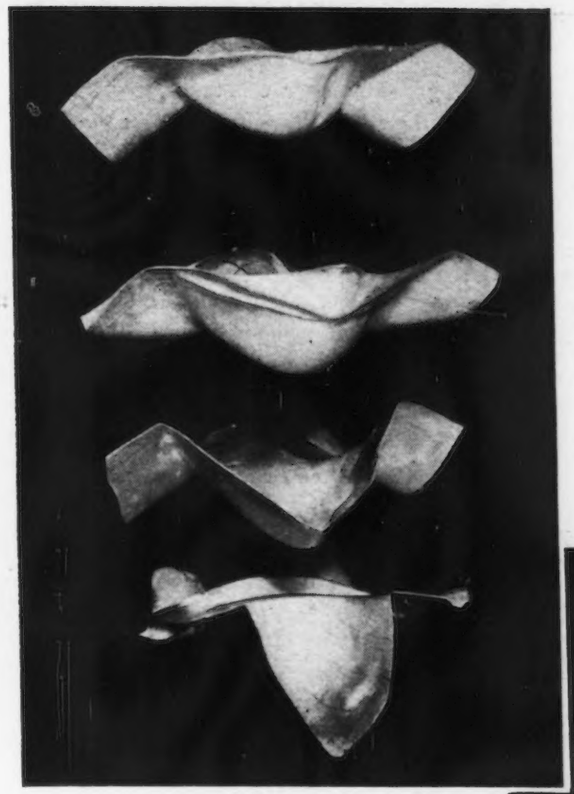
ONE of the constructive outgrowths of pressures imposed by war was the compulsion upon manufacturers to devise simpler and more economical production methods to keep up with the demand for more and more goods. World War II imposed extremely heavy demands upon the metalworking industry and encouraged the development of new processes, among which is the Sol-A-Die process for the fabrication of unorthodox parts by stages, devised at Solar Aircraft Co.'s San Diego plant.

The problem of developing successful and economical methods of producing complex and irregular shapes for production orders too small to warrant complicated and expensive press tooling has long plagued the metalworking industry. During the war Solar's principal product was aircraft exhaust manifolds, which were formed from 18-8 austentic steel.

The necessity for forming intricate shapes is frequently encountered in this work because of the need to adapt design to the engine and airframe used in fighting and bombing craft. The volume of experimental work in the successful development of aircraft was tremendous, and the need for speed was pressing. There was no way to determine in advance whether the development or experimental orders first received would be followed by production orders in sufficient volume to justify heavy tooling expense. It early became apparent that some improvement in the technique of providing stage dies was not only desirable, but



ABOVE

FIG. 3—Four steps in forming an aircraft part on which production is low but accuracy and speed of production are essential.

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RIGHT

FIG. 2—An odd shaped stainless steel part formed by the Sol-A-Die process, and gridded to show that even in the final stages the grids are nearly square.

nearly essential to assure meeting the demands imposed.

Fabrication of unorthodox parts by designed stages is an art which had been practiced by only a few skilled tool designers, but the tremendous expansion of the industry plus the movement of even these highly skilled experts into the armed forces left fewer to go around. It was surrounded by a considerable amount of time-consuming, cut and try methods. Study convinced Solar of the soundness of its original conclusion—that this system afforded little opportunity for improvement and it would be necessary to strike out boldly into relatively untried fields.

A simplified process was developed, later named the Sol-A-Die process, under which it was possible to produce stage die patterns in less than half the time previously required, and almost without exception these dies produced successful stampings without reworking. Several alternatives were tried during development, but in final form the following routine, subsequently patented, was adopted:

(1) The final die was designed in the conventional manner.

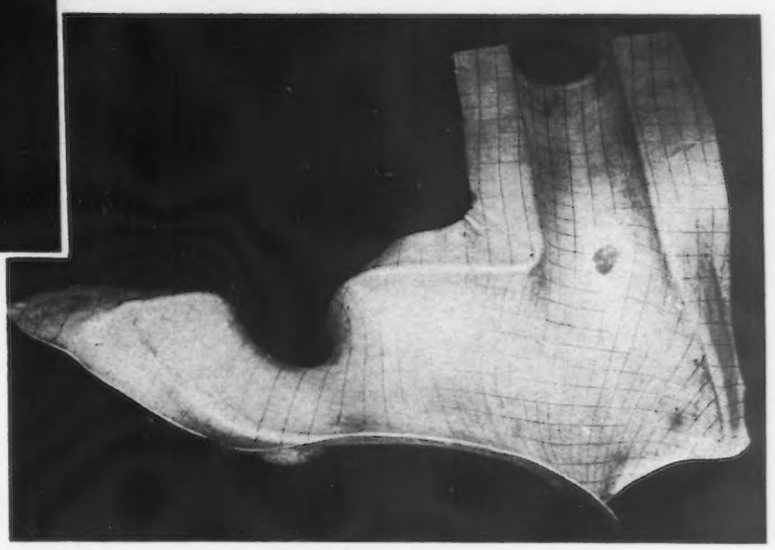
(2) A water-soluble slip coat was sprayed on the die.

(3) Alternate layers of melted beeswax and cheesecloth were built up to a thickness of about 3/32 in., the threads in each layer of cloth being arranged at a 45° angle to those in the layer below.

This built-up cover was allowed to stiffen, and then was separated from the final die pattern by lifting the edge and allowing water to dissolve the slipcoat.

The pattern sheet thus formed, while flexible, is substantially nonstretchable and nonshrinkable. It may be unfolded and flattened to any desired degree, experience showing that this may most conveniently be accomplished on a modeling table using clay bolsters to hold the pattern in the desired position, as shown in fig. 1. After backing the pattern with about 2 in. of plaster, reinforced with jute fiber, the backing is allowed to solidify. The pattern is then inverted, tilted to the desired position with the modeling table representative of the hammer bed, and bolstered with clay. This forms the matrix for the Sol-A-Die pattern.

When it is desired to use more than one stage, the



BELOW

FIG. 4—The new process may be applied to the forming of Alclad parts, as seen in this part for a B-32 airplane made from 0.032-in. material.

process may be repeated, either by using the original pattern, unfolded and flattened still further, or by molding a new wax on the Sol-A-Die pattern just completed. The latter process was found most satisfactory and is generally used at Solar.

In working with the process many advantages were discovered. It was sought to minimize deformation of material, reduce welding through fabricating in as few pieces as possible, eliminate rejected stampings, eliminate need for machine and hand peening, reduce intermediate annealing, cut down intermediate trim operations, and to reduce the initial blank size. All of these objectives were attained to a considerable degree.

Conventional forming methods previously in use with stage dies attempted to maintain metal thickness by offsetting stretch and thinning in the direction of the hammer blow by compression at right angles to it. This generally required annealing between stages and a considerable amount of peening. With Sol-A-Dies, the first relatively shallow draw deforms a blank of adequate size to the full absolute area which will be required in the final part. Subsequent dies fold the prepared full area blank into its final form.

Even if there are vertical surfaces in the final part, the wax pattern can usually be opened to a point where none of the slopes are steeper than 20°. Reverse curves have often been found useful in reducing the total depth of the initial stage die.

Gridded specimens were used to study results, as shown in fig. 2, and it was determined that even in the final stages, with side walls nearly vertical, the grids were nearly square.

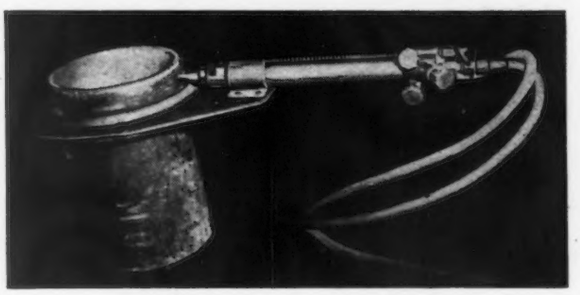
In determining the number of stages to be used, the operator is guided more by the ability of the part to nest in the next later stage than by consideration of maximum elongation before annealing. A typical four-stage arrangement is shown in fig. 3. In all but extreme cases, interstage annealing has been found unnecessary. Longer life is secured for both dies and stampings, since the usual shearing and tearing actions are almost eliminated, even when the parts have vertical or nearly vertical sides, as nearly all the deformation is done by direct impact in the first relatively shallow stage. Peening has been reduced to what can be considered essentially a standby operation. With this process it has been possible to hold thinning down to within 10 to 15 pct, allowing weight saving through the use of thinner metals, an important factor in the manufacture of exhaust manifolds.

While Solar was primarily interested in the forming of 18-8 austentic, experimental work was also done on intricate shapes which used aluminum and Alclad with complete success as shown in fig. 4. Metals having low limits of elongation will, of course, require more stages and it is even possible that savings in tooling costs will be even more pronounced. Flexibility has been the keynote of the process, and there is every indication that it is adaptable to a wide variety of fields. A patent has been granted on this process.

Guide Simplifies Gas Cutting of Pipe

OBTAINING good square cuts when cutting pipe with oxyacetylene equipment is simplified through the use of the attachment shown in the accompanying illustration, according to Linde Air Products Co. The device guides the blowpipe in a true line and keeps the nozzle at a constant distance from the work.

The base of the guide is a pipe flange that slips easily over the pipe to be cut. Steel shims can be welded to the inside of the flange if it is too loose. A boss welded to the flange has a setscrew to prevent the flange from slipping on the pipe. A collar cut from a piece of sheet steel is slipped on the pipe flange. This collar should be fitted so that it can rotate around the flange without binding and yet not be too loose. The blowpipe is held by a piece of sheet metal attached to the collar. In operation, the guide is placed on the pipe to be cut. The flange remains in one position while the rest of the attachment rotates around it.



Supersonic Inspection of Steel

SUPERSONIC examination of steel should be regarded primarily as a new instrument of investigation, capable of giving information about the internal character of masses of steel which cannot at present be obtained by alternative means. It does not, of itself, distinguish the bearing which the observations may have on the suitability of a material for any specific purpose. These conclusions were drawn, after extensive investigation of the instrument, by members of the Alloy Steels Research Committee according to a report made at the annual meeting of the British Iron and Steel Institute.

The committee report, consisting of three parts, was entitled "Detection of Cracks in Steel by Means of Supersonic Waves." Section 1 of the report reviews previous methods of detecting flaws in steel by means of sound waves, especially of high frequency. A short account of a method of measuring damping of oscillations of high frequency and very small amplitude is included. Section 2 describes apparatus employing piezo-electric quartz transmitters for producing intermittent pulses of supersonic waves and receiving them on similar quartz crystals after reflection, the reflected waves being electrically amplified and indicated on a cathode-ray oscilloscope.

In Section 3 are given the results of applying the new method in works practice, including the testing of large masses, billets, plates, castings and welds. The conditions necessary for the satisfactory use of the apparatus for practical testing are discussed.

Welding Precious Metals

By F. W. MEYERS, JR.
Welding Engineer

Expanding use of gold, silver and platinum in the chemical, electrical and other industries has focused new attention on methods of fabricating these materials. The author describes in detail practical methods of welding these metals by the torch and by the hammer methods. Both pure metal and clad metal are covered.

USE of precious metals in industry, especially in the chemical and electrical industry, is much greater than is commonly realized. Welding of these metals finds wide application, particularly in the construction of special type apparatus. The main reason for their use is primarily their high resistance to corrosion, although their scarcity and high cost, particularly in the case of gold and platinum, imposes certain limitations as to increased use. Silver has the widest general application because of its substantially lower cost, but like the others, is worked in the thinnest possible sheets to reduce expense. This naturally influences the welding procedures and techniques used.

In the construction of various types of apparatus, gold is used for the lining of special vessels, coating of tubes, and forming of sections and fittings. The thickness of the material commonly used varies between 0.01 and 0.02 in. for lining purposes, whereas for plating work the thickness is usually reduced considerably below this. It is extremely malleable and relatively easy to weld.

The hammer welding process is used almost exclusively for precious metal welding. The preparatory work usually done prior to welding is as follows: The pieces to be welded are set to overlap each other on about 3/32-in. surface with both sections edged off on one side. The edging off process is accomplished by means of a ball shaped hand hammer. The gold sheet completely edged and shaped is first tack welded throughout its whole length. To preheat the joint, an oxyhydrogen flame is generally used, with a slight excess of hydrogen. The use of acetylene produces at this temperature, and in the required ratio, too great a carbon deposit in the weld. For the same reason, only pure hydrogen should be used. The specially designed welding torch must be regulated in such a way as to give a mild flame about 4 in. long.

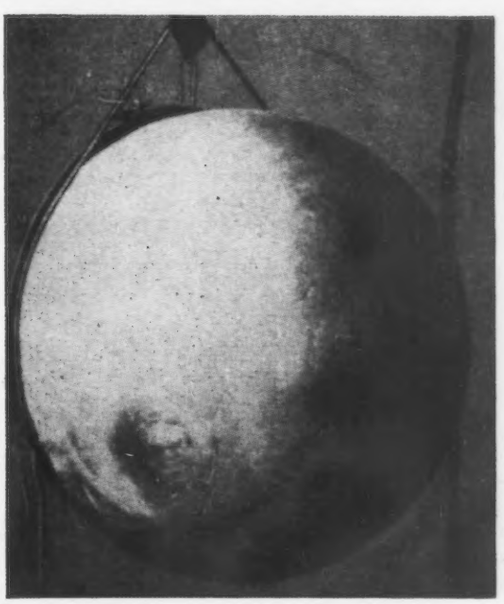
Before beginning the operation, the anvil used as a back-up base for hammering should be carefully cleaned and heated to approximately 212°F. By means of light but skillful hammering the operator can produce a weld without any particular difficulty using a welding temperature of approximately 1740°F. Care should be taken not to overheat the material to be welded otherwise it is apt to sag, in which case the hole produced cannot be repaired without affecting the quality of the weld. When the welding operation is completed, the welded area is subjected to cold working to increase its resistance.

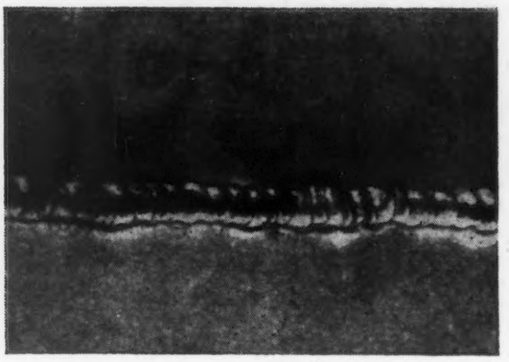
Resistance welding is used only on sections where hammer welding is not practicable. When the use of filler metal is required, the operator should use the same material as that of the base material, which would normally be a fine gold. This welding process likewise requires the use of an oxyhydrogen flame, but the torch must be regulated for a higher welding temperature required because of the filler rod addition. The operation should be completed as rapidly as consistent with good practice, as good results cannot be obtained by excessive heating and hammering.

Gold plated steel, with the exception of a few assays, has not up to the present time been the object of wide welding application. The fact that industry has rarely ever demanded this combination of metals accounts for this, as there is no particular difficulty in obtaining welds with this combination of materials.

The most practical way to successfully weld a com-

FIG. 1—Lower end of a welded silver tank. Seams have been completely finished, and are invisible.





ABOVE

FIG. 3—First pass of the weld made in the horizontal position.

LEFT

FIG. 2—Upper end of tank showing the appearance of the seam before final finishing.

bination of materials of the above type is to finish first the welding of the steel side, by means of the arc welding process, and then to deposit on the gold side, a gold foil by means of hammer welding. The thickness of the gold foil is usually slightly greater than that of the layer used for plating work.

Welding of Platinum

Platinum is used to line processing and reaction vessels, also in the forming of tubing, valves, siphons, etc. In the electrical industry it is used for the manufacture of thermocouples, temperature measuring and recording instruments, high temperature furnace windings, electrical contacts, voltage regulators, and similar equipment.

It can be seen that platinum, the chemical reactions of which are practically the same as those of gold, also finds wide application in the construction of much special type apparatus. Metallurgically pure platinum, with a minimum platinum content of 99.5 pct is almost exclusively used for welding purposes. For technical and economical reasons, material from 0.01 to 0.02 in. thick is principally used for lining work. In other applications, the thickness of platinum can be further reduced. This metal is less fusible and considerably harder than gold. Working and welding it therefore is a little more difficult, this difficulty applying only to the metallurgical results of the welding procedure. From the point of view of the welding operator, the operation is comparable with the working and welding of gold. In some respects it is easier, in that sporadic sagging or burning-off is almost impossible.

As in the case of gold, hammer welding is almost exclusively used for platinum welding, and the procedure is practically the same. The welding temperature is considerably higher, being approximately 2370°F. Under no circumstances should welding be performed at too low a temperature, as subsequent shaping might result in cracking. When the operation is finished the welded piece is subjected to hammering in the hot and cold state to eliminate residual stresses and increase the resistance of the weld.

Resistance welding of platinum is carried out in the same manner as that of gold, taking into consideration the difference of temperatures existing between the two metals. For both welding procedures the oxy-hydrogen flame is used for preheating prior to making the resistance weld.

For platinum plated steel the procedure is practically the same as for gold plated metal, the main difference being that to weld a seam, a gold foil is used because of the tendency of the steel to diffuse readily in the thin platinum foil when the high welding temperature is attained. This diffusion is apt to produce places with low resistance to corrosive agents. Should danger of corrosion or lowering the resistance qualities of the base metal prohibit the use of gold foil, the weld may be successfully made by inserting a nickel lining plated with platinum. Owing to the higher melting temperature of nickel the danger of diffusion is considerably reduced.

Welding of Silver

Some of the principal uses of silver are for vacuum pans, evaporators, condensers, and storage tanks. Special equipment has been made for chemical oil and dye plants also. As the demand of modern industry for corrosion resisting materials steadily increases, silver, due to its greater availability, is receiving widespread acceptance and application. Its properties give good weldability and the welds satisfy the chemical and mechanical requirements in a manner corresponding to the base metal. Although silver is easily worked, welding operations produce considerable difficulties and require a great deal of experience. These difficulties are due to the characteristic physical properties of the metal; low heat volume, high heat conductivity, and high elongation. The welding process in addition is made more difficult by the tendency of silver to absorb excessive amounts of oxygen while in the fusion state.

The usual methods for welding silver are hammer and resistance welding. For plated material, the most advantageous method has proved to be the arc welding of the steel side, combined with either hammer or resistance welding of the silver side. Arc welding of solid silver does not generally give very satisfactory results. As for the atomic hydrogen process. its application to this metal would be of little advantage, be-

cause the main advantage of this process, the concentration of heat in a small area and reduced heating of the base metal, is of little value, due to the high heat conductivity of silver. In the choice of procedure used, the operator must carefully consider the type of material he intends to weld, that is, solid silver or silver plated metal, either light or heavy, with a smooth or rough finish.

As usual in the hammer welding method, both welding surfaces are edged off for an overlapping connection ¼ to ⅜-in. wide. Polishing the edged off surfaces with an emery wheel facilitates the welding process. The welding area should be preheated to a temperature of 1560 to 1650°F., by an oxyacetylene torch with a slight carburizing flame. When this temperature is reached, a thorough working of the base material by heavy blows of a slightly ball shaped hammer results in complete connection of the parts to be joined. Considering the heat conductivity of silver, the anvil, and the steel used in lining containers, careful attention must be given when heating the steel side. Hammer welding should only be used for thin sheets up to approximately 3/64-in. thick. With base material over 3/64-in. thick, good practice recommends resorting to combined hammering and oxyacetylene flame welding, that is, tack welds are made first by means of hammer welding, and then the complete welding operation is made by means of the oxyacetylene flame, which causes the base metal to fuse together without addition of any filler metal.

Material with a thickness exceeding 3/64 in., is welded with considerable less difficulty and greater success, by the oxyacetylene method, in place of the hammer welding method. To obtain high strength properties, the weld area is subjected to cold working.

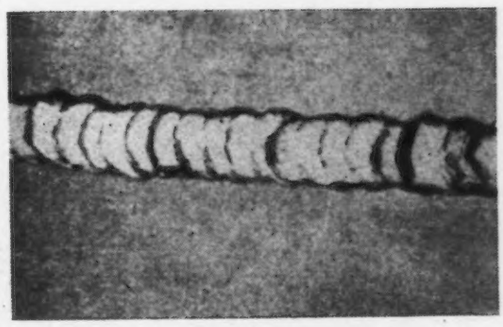
The oxyacetylene flame has proved to be the most practical method for silver welding. Owing to the high heat conductivity of silver, the torch tips normally used for the welding of steel of a like thickness are not large enough. For silver welding they should be one or two sizes larger than those used to weld steel of the same thickness. For the same reason care should be taken to preheat thoroughly the pieces to be welded. In welding base material of very heavy sections, the unavoidable dissipation of the heat must be compensated for by the use of a preheating torch in addition to the welding torch.

Regarding the generation of silver oxide during welding, this reaction has proved to exert no detrimental effect on the application of the process, but the absorption of oxygen into the weld has to be taken into consideration when considering the physical properties of the finished product. The welding operation therefore should be performed with a minimum of oxygen, and a slight excess of acetylene. This is also the reason why preference is given to gas welding over arc welding. By subsequent hammering of the heated weld, the operator aids in the elimination of oxygen. To complete the operation, the pores which eventually remain after the driving out of the oxygen are sealed and bonded by hammering. No noxious formation of oxide taking place on the weld, the necessity for the use of a flux is eliminated.

The preparatory manipulations for welding are practically the same as for welding steel, however the approximately 70 pct higher expansion capacity of silver must be given careful consideration. For this purpose, the joint is either widened conically, and wedges as well as clamping screws are used, or both welding edges are bent. The latter practice generally gives better welding results. Even tack welding is possible in this manner without any danger of disruption of the connected joints under the effect of the subsequent stresses; the bending of the edges produces the same effect as an expansion pad or collar.

In addition to butt welds, which are used almost exclusively in silver welding, edge joints are sometimes used when the base material is of a thickness less than 3/64 in. Fillet welds should be made only when they cannot be avoided and when no particular resistance or tightness is required. On account of the great propensity of silver to expansion, welding operations should be confined to welds that can be made in one pass. Repair and usually any postwelding operations produce additional stresses which, in their turn, are likely to produce cracks. This operation should be avoided whenever possible.

When using filler metal, the welding wire should be



ABOVE

FIG. 4—Second pass of the tank weld. Seam was preheated, and filler metal used.

RIGHT

FIG. 5—Appearance of silver tank weld after reheating and hammering while hot.

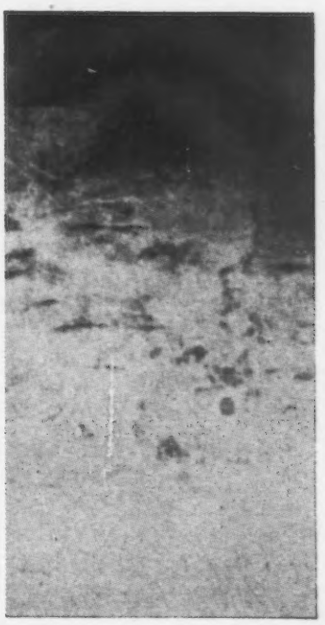


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FIG. 6—After cold working and etching the weld disappears.

of the same composition as the parts to be welded, and with a diameter of about 3/32 in. for welding a base metal of the previously mentioned thickness. Filler material is not deposited until the edges to be joined begin to melt, this method being the best way

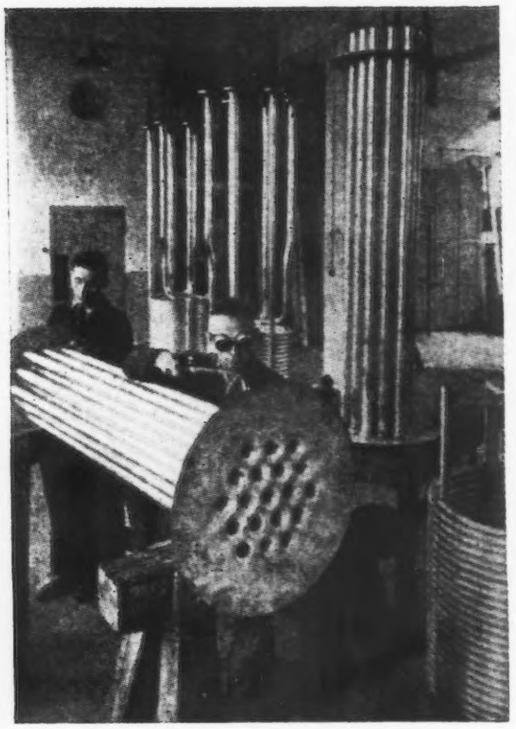

FIG. 7—Welding silver tubes to header plates requires special precautions because of the high coefficient of expansion.

to obtain really complete fusion between base metal and filler metal. Care must be taken to avoid intense local overheating, which is likely to produce sagging. Repairing the resultant hole is a great deal of trouble, and does not always eliminate the weak point in the weld. To avoid this defect, the operator should move the torch with a circular movement, with a radius of of approx. 5/8 in. Backhand welding is normal practice and seems to be also the most advantageous. To prevent excessive shrinkage, it is best to begin welding at a distance no less than 2 to 4 in. from the end of the part to be welded. Stress must be put on obtaining complete fusion of all the elements of the weld. By hammering the welded area in the hot and cold state the weld is refined so that it loses its brittle characteristics and attains almost the same strength as the base metal. It should be pointed out in this respect that the seams should not be located in sharply abrupt corners, which may cause additional stresses. Any post treatment by hammering under these conditions is generally accomplished with poor results.

A silver weld made in accordance with the basic rules of silver welding can be absolutely tight and free from porosity, and possess the same corrosion resisting properties as the base metal. Naturally a great deal of the success obtained is dependent upon the skill of the operator.

The following figures illustrate some typical successive phases of silver welding: Fig. 1 shows the lower part of a tank with a diameter of 72 in., made of fine silver sheet material 1/8-in. thick. The weld seams have been completely finished and are therefore no longer visible. In fig. 2 can be seen the upper part of the same tank with a seam which is not yet finished. After joint preparation and after preheating the welding area with the oxyacetylene torch, tack welds at intervals of approximately 8 in. were made, then the final welding was accomplished by fusing together the edges of the joint.

Fig. 3 shows the first pass of the tank weld. The weld being made in the horizontal position. The next pass is represented by fig. 4. This weld was also made in the horizontal position, after preheating by means of an oxyacetylene torch, and with the addition of filler metal. When this pass was completed, the weld was again heated and hammered while hot. The weld finally produced appears as shown in fig. 5. In fig. 6 is shown the finished weld after cold working and subsequent etching. It is almost invisible to the naked eye.

Fig. 7 illustrates the effect of the high heat conductivity and tendency to expansion of silver during the welding operation. The group of tubes are made entirely of fine silver. The process of welding the tubes on one of the bases, by means of welding gives relatively little difficulty, the material encountering no obstacle to expansion. Considerable trouble can develop when the second base is welded. As soon as a few of the tubes have been welded to the base and cooled, they naturally tend to counteract the expansion pressure of each of the following tubes.

This reaction being repeated at each new tube, the material of the base has to sustain exceptionally high stresses. These stresses soon led to a break in the heavy silver base plate which was 3/16-in. thick. To prevent a new rupture, it was found necessary to proceed as follows: To give the base metal additional heat treatment, then to place an asbestos covering over it so as to reduce as much as possible the rapid dissipation of the heat, and finally to design a clamping device which checked the longitudinal expansion of the tubes, permitting them only to bend out of the tube axis. The results using this method proved quite satisfactory.

When welding silver plated steel, the following must be taken into consideration: The preparation is the same as for other base metals, and butt welds should be used whenever possible. Both butt edges of the plated part must be bevelled on the steel side, to an angle of 30 to 35° by means of a cutting torch or grinding wheel. The plating layer is removed on both sides of the joint to a width of approximately 5/32 in. Before starting welding on the silver side, both edges of the plating layer are edged off by means of a ball shaped hand or air hammer. On account of the considerably lower melting temperature of silver, the steel side is welded first. Either oxyacetylene or arc welding may be used for the welding of the steel side, the latter being more advantageous because of the limiting of the heat affected zone. The root of the seam of the steel weld should be chipped with an air hammer, so as to insure complete penetration. After this operation the joint receives a seal bead from this side. When this bead has been ground flush, the joint which is free from the plating coating is filled with silver by means of the above described methods, that is either hammer, or oxyacetylene welding. All the operations for the welding of the silver side are the same as those described previously.

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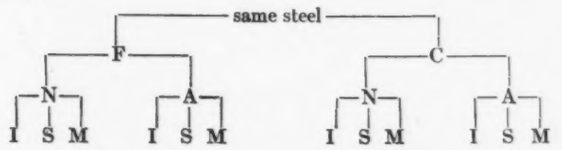
Effect of Temperature on Carbon-Moly Steel

IN a paper entitled "The Effect of Carbide Spheroidization Upon the Rupture Strength and Elongation of Carbon-Molybdenum Steel" presented by S. H. Weaver, Turbine-Generator Engineering Div., General Electric Co., Schenectady (retired), at the 49th ASTM annual meeting, data was presented bearing on the service life of high-temperature equipment, particularly steam turbines.

The author described the results of rupture-stress tests in comparison with creep strength tests previously reported. The same temperatures, 900° and 1000°F, are used, as well as the same steel—0.17 pct C, 0.42 pct Mo, 0.88 pct Mn, 0.20 pct Si, 0.004 pct Al and 0.021 pct Al_2O_3. Specimens were treated to obtain 12 different conditions of the steel, by varying the heat treatment and the amount of spheroidization, as follows:



where *F*—fine grain, *C*—coarse grain, *N*—normalized heat treatment, *A*—annealed heat treatment, *I*—initial condition (not aged), *S*—cementite fully spheroidized, and *M*—spheroids fully massed.

Fig. 1 shows the relation between constant-load rupture stress and rupture time for each of the specimens tested in the 12 conditions at 900° and 1000°F. There is a spread between the rupture-stress curves for the initial and spheroidized conditions similar to that found previously in the creep tests. A change in shape occurs in all curves for the initial condition (*I*) of the steels but the amount of change is greatly reduced for the normalized spheroidized conditions and is not present within the 10,000 hr of test for the annealed spheroidized steels.

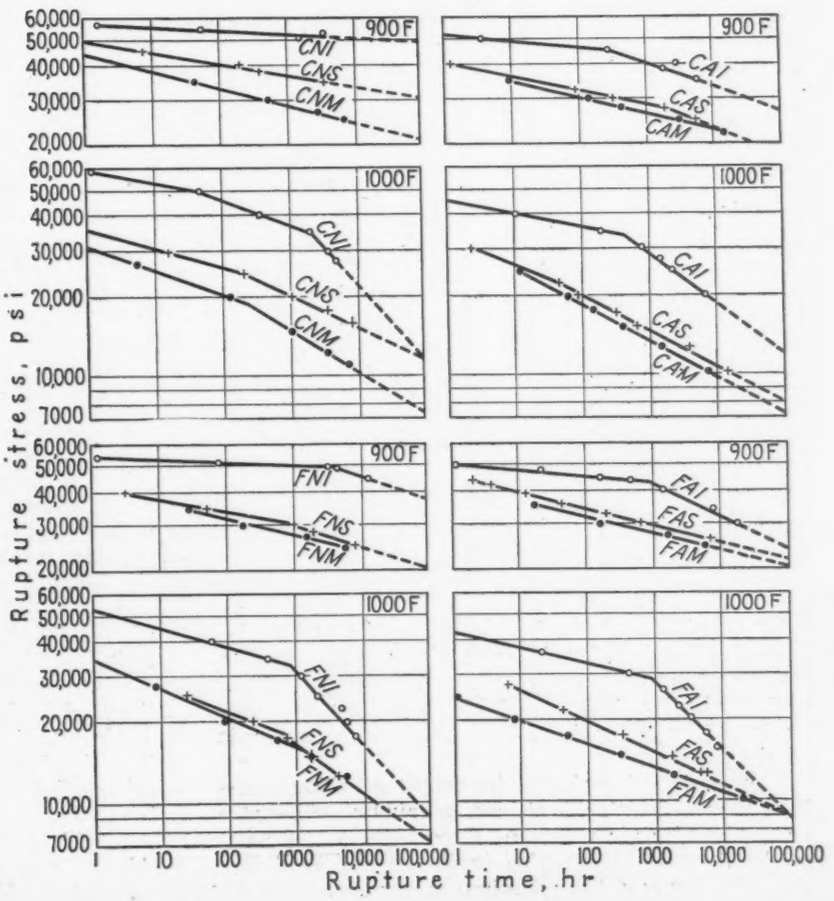
The change in the slope of the curves through the rupture-stress test points is ascribed to oxidation of specimens by the air in the test furnace. Oxygen penetrating the metal increases the slope of the curve. A change in the type of fracture is evident where the slope of the curve increases. Failures in the shorter time tests are characterized by a transcrystalline fracture through the grains, changing in the longer time tests to an intergranular break following the grain boundaries. The latter fracture is characterized by a small reduction in area and is usually termed a brittle failure.

Also, the curves for the spheroidized normalized steels, *NS*, and *NM*, have a very slight change in slope while the curves for spheroidized annealed steels, *AS* and *AM*, have no slope change in tests up to 10,000 hr. This indicates that the effect of oxidation from the furnace air is very slight for the *S* and *M* spheroidized conditions and that the change from transcrystalline to intergranular fracture is delayed by the previous spheroidization treatment given the test specimens.

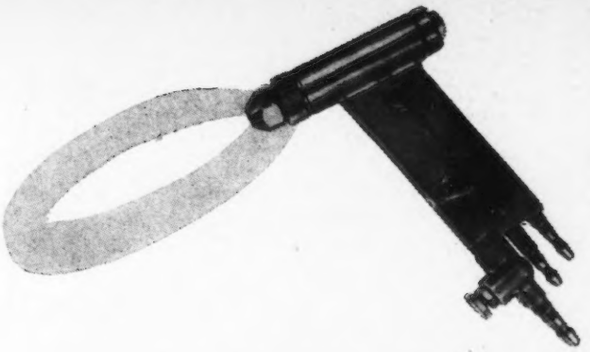
Rupture Tests Parallel Creep Tests

Results of long-time rupture tests in different conditions of carbide spheroidization parallel the results of creep tests made on the same material. While the initial rupture and creep stresses vary greatly for the different conditions of the steel, in approximately 20 yr of operation at 900°F some of the items decrease in creep to 46 pct (of the initial condition) and rupture stress to 52 pct—and at 1000°F to 23 pct for creep stress and 45 pct in rupture stress. In the selection of heat treatment, the same conclusions apply to both creep and rupture tests. At 900°F the normalized structure is the major factor and when combined with the coarse grain it produces the strongest steel, while at 1000°F the coarse grain predominates.

FIG. 1—Rupture stress and the corresponding time for 0.5 pct molybdenum steel with differently spheroidized microstructures.



Flame Sprayed Plastics



Application of various plastics by spraying finely ground powder through an oxy-propane flame is described herein. Characteristics of a sprayable thermoplastic material finding wide use in the plating industry as a tank lining are discussed.

o o o

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Long Island City, N. Y.

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THE Schori process for spraying plastic coatings uses a finely ground powder and sprays this powder through an oxypropane flame. For each type of plastic, the base material, such as polythene or synthetic rubber, is modified so that it can be sprayed through the flame gun to produce a sprayed coating comparable to the base material in physical and chemical properties. The modifications are chiefly to prevent decomposition in the flame, improve adhesion and increase toughness and impact resistance.

The powder used in the Schori gun is finely ground, preferably of a size that passes 100 pct through a 50 mesh screen and not more than 10 pct through a 150 mesh screen. This powdered material is placed in an "hour glass" container from which it is fed through the patented spray gun. The powder feed method used in this gun is to suck air along a pipe line attached to the container. The air is sucked by means of a partial vacuum generated in the gun. The powder is thus conveyed suspended in air at reduced pressure and packing is impossible.

The gun is a flamespray gun using an oxyacetylene or oxypropane flame. The powdered material passes through the flame in a matter of milliseconds, too fast for actual melting to take place before contact with the object being sprayed. The repeated passing of the flame over the powder on the surface and the heat of the object sprayed combine to melt the powder into a continuous non-porous coating.

The equipment is easily and economically included in production lines for either plastic or metal spraying. The same gun with no alterations will spray metals as well as plastics. The use of fine metal powders, pure, or in mixtures, or in alloys, produces a fine grain coating.

Preparation of surface to be coated is by blast cleaning. Coarse angular steel grit, aluminum oxide grain or sand under air pressure of from 90 to 100 psi is used. The surface must be absolutely free of all dirt, rust, dust or any other foreign matter and must also be rough in order to get good adhesion of coating to the metal.

One of the sprayed plastic coatings finding growing application is Schorithene. This series of materials has as a base a thermoplastic polythene produced by E. I. du Pont de Nemours. The properties of the Schorithene coatings closely follow the properties of polythene itself. This is true although several materials may be mixed with polythene in volumes up to 50 pct. There is very little decomposition in the flame as the material is sprayed.

The approximate properties of the materials in the Schorithene series are:

General: Specific gravity, 0.9 to 1.0. No odor.

Mechanical: 100 pct elongation. 1000 psi tensile strength.

Electrical: 460 v per mil dielectric strength.

Stability: 0.0005 pct water absorption after 24 hr immersion. Age no effect.

Schorithene 522 is widely used in the plating industry. This flame-sprayed plastic lining is in direct competition with other tank linings of rubber or plastic sheet. Schorithene is applied, as shown in fig. 1, through a flame on a heated surface in a continuous application of approximately 15 passes. Each pass is thoroughly melted into the material already applied. There is no possibility of separation between layers because there actually are no layers. The lining is in one piece as if it were molded and set into the tank. If the lining is broken in one spot, that spot can be patched without disturbing the rest of the lining. The costs of applying these coatings on flat surfaces range from $1.50 to $2.25 per sq ft for thickness up to 110 mils.

Another sprayed coating meeting with wide use is Schorokol. The base material for this coating is Thiokol, a synthetic rubber manufactured by the Thiokol Corp. Two materials make up the Schorokol series. One is Schorokol 110, a vulcanized synthetic rubber; the other is Schorokol 100, a synthetic rubber that is not vulcanized.

The spraying of Schorokol on steel propeller shafts, fig. 2, fitted with bronze propellers and on steel rudders and struts was the first practical solution to a serious maritime problem during the war. Unprotected steel shafts would become pitted to the extent that they had to be replaced after four months service because of the swift corrosion taking place due to the electrolytic action set up by the salt sea water between the two dissimilar metals. Shortages of rubber and the need for keeping ships in continuous service made a solution of this problem imperative. Other applications for Schorokol are on industrial equipment where rubber lining for abrasion and corrosion resistance is required, as on impellers and rollers. A new coating, still in the experimental stage, has a polyvinyl chloride base and is expected to have application for mechanical, electrical and chemical purposes.

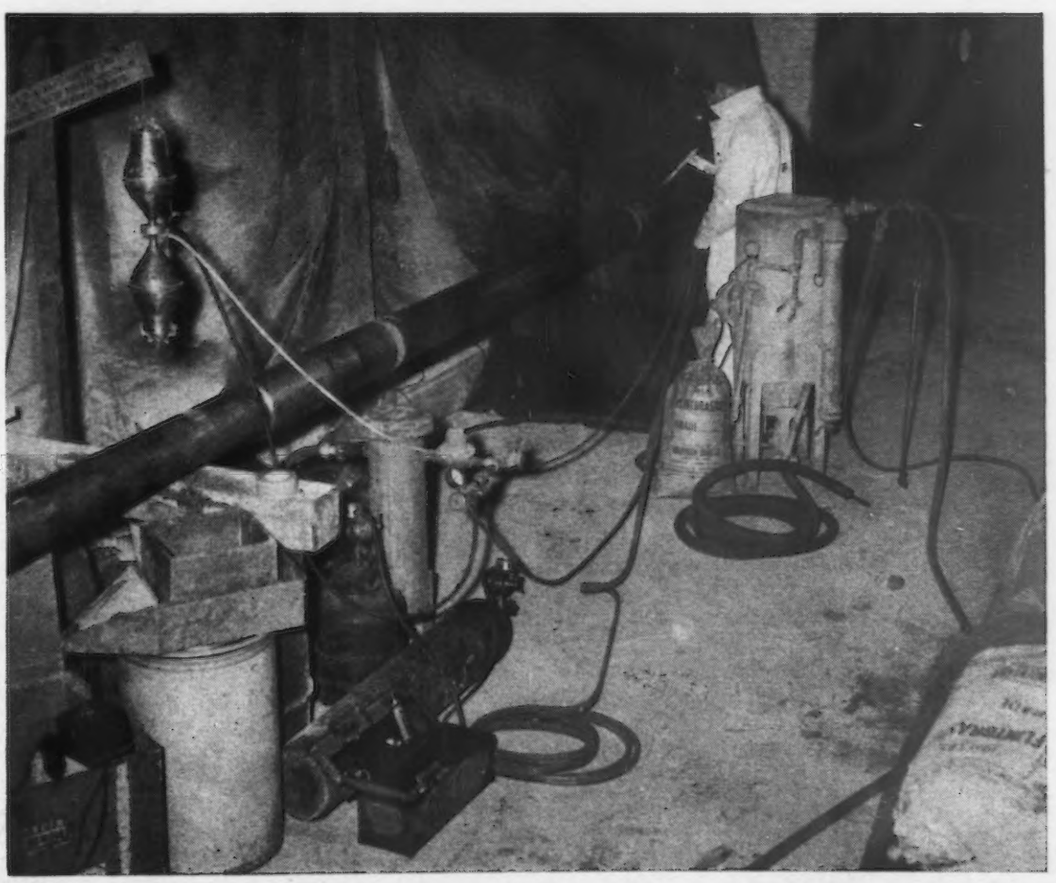
ABOVE

FIG. 1—Plastic lining being sprayed on a tank for bright nickel plating. Note hour glass container, left, which feeds the powdered plastic.

o o o

RIGHT

FIG. 2—Spraying a vulcanized synthetic rubber base material in a propeller shaft.



Wartime Research in Metalworking Materials and Processes

REPORTS covering government-sponsored research in numerous technical fields of interest to engineers and executives in the metalworking industry, issued recently by the Office of Technical Services, Washington, are briefly described below. Copies of the reports may be obtained in either photostat or microfilm form from the Office of Technical Services, Department of Commerce, Washington 25. When writing regarding these reports it is advisable to use the "PB" identification number given with each abstract.

Low Freezing Point Alloys—Molten heat resistant alloy steels with low freezing points generally have greater fluidity than those with high freezing points, according to W. S. Mott and R. H. Schaeffer of the American Brake Shoe Co. Application of this principle by foundries may reduce the number of misruns, cold shuts, round corners and similar defects. Other factors, such as high chromium content and aluminum used as a deoxidizer, were also found to affect fluidity. Freeze point determinations and cooling curves are described in particular detail. **PB-16748: Photostat, $2; microfilm, 50¢; 26 p.**

Flash Welding—Flash welds in tubing and rods have been found to be as strong as the parent metal provided prewelding heat treatment is not excessive. According to a report prepared by staff members of the Battelle Memorial Institute, Columbus, Ohio, heat treating ½-in. tubing to a tensile strength of 150,000 psi before flash welding gave joints of equal strength to the parent metal. However, heat treating to strengths of 180,000 psi or higher produced welds with less strength than the parent metal. In a later report the same investigators state that fatigue properties of the weld are equal to those of the parent metal when the weld was ground flush with the plate surface. **PB-16472: Photostat, $5; microfilm, $1; 64 p. PB-16471: Photostat, $5; microfilm, $1; 65 p.**

Drawing Practices—Studies on six armor steels of varying chemical composition made during the war at the Battelle Memorial Institute, Columbus, Ohio, indicate that mechanical properties are little affected by variations in draw practice, except insofar as hardness was simultaneously affected. Figures and charts included in the report lead the authors to the conclusion that temper brittleness is probably a precipitation phenomenon which occurs in steel during prolonged heating at 900°, 1000° and 1100° F. **PB-15843: Photostat, $3; microfilm, 50¢; 41 p.**

Quality Control—Statistical correlation of melting and pouring practices for the production of gun steel with the properties of the finished product indicates that pouring temperatures, control of the oxidizing power of the slag and the direct rolling of ingots are factors determining the quality of a gun steel. In this two-part report, J. G. Mavrec and John Welchner of Timken Roller Bearing Co., conclude that there appears to be a relationship between the total inclusion content of a steel and the percentage of reduction of transverse area. The cleaner the steel, the higher is its transverse ductility. **PB-15846: Photostat, $4; microfilm, 50¢; 50 p.**

Polarographic Determination—A polarographic method of determining iron and zinc content in protective phosphate coatings has been developed by workers at the Rock Island Arsenal Laboratory. This method may be used for determining the ratio of zinc to iron, as well as the amounts of iron and zinc phosphates per unit area. **PB-4397: Photostat, $2; microfilm, 50¢; 26 p.**

Lead Corrosion—Atmospheric corrosion of lead coatings on steel is slowed down if the lead-coated steel is cold-rolled, according to a report on wartime research conducted at Battelle Memorial Institute, Columbus, Ohio. Electrographic and humidity tests reveal that cold reduction of lead-coated steel causes the coating to have fewer and smaller pinholes. **PB-18829: Photostat, $2; microfilm, 50¢; 20 p.**

Precision Casting—A report on the economies of precision casting prepared for the U. S. Naval Research Laboratory gives photographs of precision castings and discusses some of the problems involved in this process, including production of the wax pattern die, methods for die parting and thread casting. **PB-15981: Photostat, $1; microfilm, 50¢; 12 p.**

Gold Solder—An alloy of 37.5 pct gold and 62.5 pct copper has been successfully used as a solder in vacuum tube construction. Twenty vacuum joints, including copper to steel, copper to fernico and copper to copper were made with this solder without leaks or mechanical failures. Wartime experiments with this material were conducted by General Electric Co. **PB-15151: Photostat, $1; microfilm, 50¢; 6 p.**

Steel Design—Sound principles have been developed for the design and heat treatment of steels to give the mechanical properties demanded for any specific job, according to J. L. Hollomon and L. D. Jaffe, metallurgists at the Watertown Arsenal Laboratory. The report reviews and assembles the known information of the actual design procedure that will insure the optimum combination of mechanical properties in a desired part. Deficiencies in existing knowledge are also pointed out. **PB-18391: Photostat, $15; microfilm, $2.50; 154 p.**

Fine Diamond Dies—A method for making fine diamond dies, 0.0004 to 0.015-in. in size, in roughly one-third the time required by previous European and American methods, was developed by American wartime researchers working at the National Bureau of Standards. Use of electric current in the drilling process was the chief innovation in this new method. With the methods used by the Bureau of Standards, a die could be made in about 40 hr; previously 115 to 170 hr were required. **PB-16402 to PB-16408 inclusive, Office of Technical Service, U. S. Dept. of Commerce.**

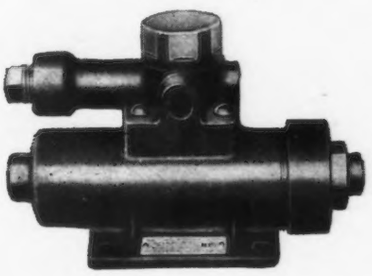
Ferritic Steel Failures—Many ferritic steels show failure under lowered temperatures and generally react differently from other industrial alloys during cooling. Four reports on the behavior of these steels are available. These reports give data on the impact behavior of forged steels together with photomicrographs and curves plus a general analysis of the reaction of these steels to lowered temperatures. **PB-16398 to 16401 inclusive, Office of Technical Service, U. S. Dept. of Commerce.**

New Equipment . . .

Plant Service

Recent developments in valves, couplings, gasketing, washers, water ejectors and air line dryers are among the units reviewed in the following pages. Electronic devices for counting and timing, and other miscellaneous items for general plant utility are also described.

TO remove water automatically from compressed air systems thereby preventing water damage to pneumatic equipment or production material, and eliminating need for manual draining, an automatic water ejector has been developed



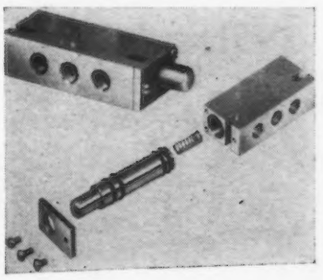
by the *National Pneumatic Co.*, 420 Lexington Ave., New York 17. The ejector never connects the compressed air system to atmosphere and therefore cannot cause any loss in pressure, it is asserted. Occupying little space, 7 11/16x2¾x4½ in. high, and mounted horizontally, the device can be installed at any location where air line water is collected. Three connections of ¼-in. pipe or ⅜-in. copper tubing are necessary; one to the bottom of the water collector, another to the drain; and the third to an air line that is repeatedly charged and discharged. With the ejector is furnished a ½ x 6 in. pipe and fittings to provide a vertical sump of ample capacity for most water removal applications.

Industrial Hose

RAYON cord synthetic hose has been placed on the market by *J. N. Fauver Co.*, 49 W. Hancock Ave., Detroit 1. It is the same Oil-resist hose with the same core and cover which the company developed before the war, but now is reinforced with two-ply rayon cord instead of the cotton fabric previously used. The improved hose is said to have 25 pct greater burst pressures and proportionately higher working pressures, weighs less, has a smaller OD for the same ID, greater flexibility and no stretch or elongation under pressure. It is said to be suitable for conducting oils, greases, steam, water and similar fluids on machinery and equipment.

Pilot Valve

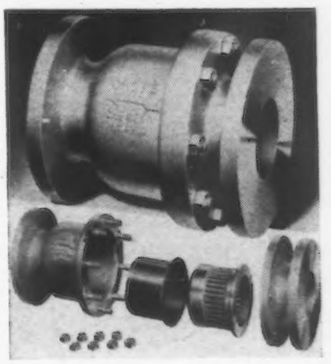
KNOWN as the CRV pilot valve, a three-way valve designed for use in the application of controlled air power to machine tool applications has been announced by *Modern Products, Ltd.*, 952 S. Grand Ave., Los Angeles 15. The unit is designed to be used as a three-way valve, normally either open or closed, or as a two-way valve, normally open or closed. Installation as



a two-way pilot valve is accomplished by simply plugging one port. The valve is compact, being 3¼ in. overall with the piston fully extended. CRV valves are operated, dependent upon the nature of the installation, by hand, foot treadle or cam which may be part of a timed sequence of operations.

Check Valve

OPERATION of the Chexflo valve, designed by the *Grove Regulator Co.*, 6419 Green St. at



65th, Oakland 8, Calif., is effected by a synthetic rubber tube, stretched over a slotted, cup-shaped metal core, which expands to open and contracts to close. Due to the fact that this expansible tube closes instantly on balanced flow, prior to the commencement of back flow, there is never any tendency, it is claimed, to establish pressure impulses, shock or water hammer through the flow line. The flexive tube possesses a uniform and constant spring rate which avoids inertia being set up to cause operation beyond flow requirements. Its wear resistant factors are said to make this unit suited for handling corrosive and erosive air, gases or liquids.

Remote Valve Control

PROVIDING a greater margin of pipeline safety by facilitating immediate control of valves in

hard-to-get-at places, a remote valve control assembly has been developed by *J. A. Zurn Mfg Co.*, Erie, Pa. From one easily accessible control board valves can be opened and closed with a minimum of delay. These assemblies can operate and control valves located below floor level, close to the ceiling or walls, inside tanks, or in the midst of complicated installations of piping and equipment. A flexible cable, or a rod or pipe connected by universal joints, transmit torque to the handle of the valve to be operated. The cover of the remote control box can be engraved to identify the type of valve it operates.

Liquid Meter Valves

THE illustrated gasoline metering valve is said to typify the advantages of selflubricating valves and slides manufactured by the *Morganite Brush Co.*, 3304 48th Ave., Long Island City 1, N. Y. It is claimed this particular valve in

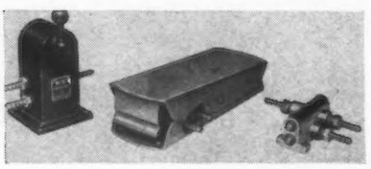
actual tests effected a reduction of almost 90 pct in operating impairments caused by friction, gumming, sticking, etc. The valves and slides are corrosion proof, nongumming, nonwarping, frequently seal across four or more pressure differential bands without trouble, and function against zinc base alloy, aluminum, cast iron, or bronze.

Gasketing

AN improved type of gasketing has been announced by the *Products Research Co.*, 634 S. Western Ave., Dept. A59, Los Angeles 5, called Chrome Lock. Originally this gasketing was introduced to shipbuilding as a substitute for rubber and other critical gasketing materials, but is said to be recognized now as suitable for practically any type of gasket use. Among the many advantages claimed for this product are: Flame resistance, fuel resistance, rust-inhibition, antiwicking, lamination, nonoxidation, and compressibility. Chrome Lock gasketing offers adhesion to metals without cementing the gasket to the flange, assuring a positive seal; it has an adhesive back and can be finger-pressed onto the surface. The gasketing is packed in both rolls and slit rolls with and without the adhesive back.

Air Valve

COMBINATION 3-way or 4-way air valves have been constructed by *Mead Specialties Co.*, 4120 N. Knox Ave., Dept. P-1043,



Chicago 41. No line filters are necessary as there are no sliding closures subject to injury by particles of foreign matter introduced through the air line. The valve seals are of the poppet type, lined with synthetic rubber. Two hardened cam followers require only 1/16-in. movement to operate the valve from full open to full closed.

Swivel Pipe Coupling

ALL-FLEX ball bearing swivel pipe couplings, designed to convey fluids under high pressure through a pipe which swivels or rotates a full 360°, have been announced by the *Snyder Sales Corp.*, 5225 Wilshire Blvd., Los Angeles 36. The combination of multiple synthetic packings and metallic seals is said to offer protection against leakage at high and low pressures. A double row of ball bearings, plus metal-backed packings, is claimed to give the lowest

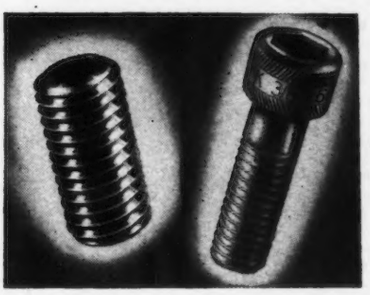
possible resistance to rotation, permitting ease of operation at all pressures. Tests have shown low torque performance of 2.5 in-lb at 1500 psi and 9.6 in-lb at 3000 psi. The coupling is preferably made of steel, and available in sizes from ⅛ to 1 in. nominal tube size with a variety of threaded and elbow connections.

Drill Holder Bushing

DESIGNED to fill a demand for a precision-built, drill holder finished bushing, the Acro-Grip bushing has been produced by the *H. C. Clatfelter Co.*, 430 W. Eight Mile Rd., Ferndale 20, Mich. It is a complete, compact single unit built in steps of sixty-fourths and can be compressed to hold any drill between the sixty-fourth steps when used in a floating tool holder. The bushing is said to hold drills parallel and accurate, with a gripping power which prevents any possibility of drills pushing back in the holder. These bushings are available in sets to match specific holders or sold individually.

Socket Screws

GROUND thread set screws and size-marked, gear grip socket head cap screws have been announced by the *Parker-Kalon Corp.*, 196 Varick St., New York 14. In

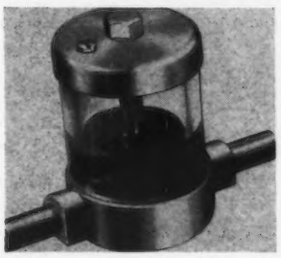


producing these units a new method of centerless thread grinding has been adapted to set screw manufacture, it is said. The threads are ground on hardened stock, eliminating the need for subsequent heat-treatment and possible distortion. The set screws have the bright appearance and characteristic smoothness and accuracy, it is claimed, of a ground finish. The size-marked feature of the socket head cap screws is an improvement enabling quick identification.

Air Tool Lubricator

SPECIALLY designed for automatic lubrication of a wide variety of pneumatic equipment, the Lube announced by *CCA Products Engineering*, Box 671, Glendale, Calif., features a full view, non-

breakable transparent plastic window which provides visibility of the quantity of oil in the lubricator. Regulation of the lubricant is accomplished by a needle valve located on the air outlet side. Since the Lube works only when air-operated equipment is in use, the device is



fully automatic permitting only the correct amount of oil to mix with working air. The needle valve can be turned off altogether in cases where no lubrication is required. The unit is available in ¼ and ⅜-in. standard pipe line sizes.

Air Lines Dryer

DESIGNATED as the 636 series, a dryer for removing moisture from air lines and gas lines has been announced by the *Gasflux Co.*, Mansfield, Ohio. Originally designed for removal of moisture from generator acetylene, the largest field of application is said to be for the removal of entrained moisture from air lines. The dryer uses different drying media for accomplishing different degrees of moisture removal. Construction consists of an outer shell of 6-in. OD seamless steel tubing and a removable inner shell or cartridge of rolled sheet metal having a perforated metal bottom and a cast bronze head with inlet and outlet openings. Incoming gas or air passes downward between the inner and outer shell, thus trapping out entrained moisture, then passes upward through the drying medium and out. Fiberglas, calcium chloride, and activated alumina are the drying media provided for use in the cartridge, the choice depending upon the drying efficiency that is required. The dryer may be bolted to a wall or suspended by pipe straps.

Heat Radiation Calculator

FOR measuring radiation for steam and hot water heating systems, a calculating device has been announced by *Heat-O-meter*, 424 W. 42nd St., New York 18. It is claimed the device, composed of a round dial with three concentric celluloid printed disks, can be used by anyone without previous technical training, to determine the correct amount of radiation by the turning of a dial. The dial also contains sizes of mains, returns, risers, radiator sizes and capacities, boiler net ratings, and other heating information helpful to plumbers, steamfitters, architects, builders, and individuals who come in contact with heating problems.

Emulsion Breaker

A LUBRICATING oil-water emulsion breaker, called Visco 77, has been announced by the *Honan-Crane Corp.*, 910 Sixth St., Lebanon, Ind. This product is a liquid chemical additive which, when added to stubborn water emulsions in the amount of 1/10 of 1 pct and the oil maintained at rest at a temperature of 180 to 185°F, will break the emulsion and all water will settle out in from 24 to 48 hr, it is claimed. Visco 77 is noncorrosive and harmless to any lubricating oil, it is said, and can be used with safety on any major circulating system.

Electronic Counter

DESIGNED for use in industries in which counting control plays an important part, an electronic counter has been announced by *Potter Instrument Co.*, 136-56 Roosevelt Ave., Flushing, N. Y. Known as a dual predetermined electronic counter, the device has been found useful as a convenient control for rolling mills where the counting of predetermined numbers of rapidly moving sheet stock is accomplished, after which a solenoid is energized to stop or divert the flow of materials. The unit represents an innovation in the field of industrial control devices, where the process to be controlled can be set up by discrete predetermined numbers. Any number from 0 to 10,000 may be initi-

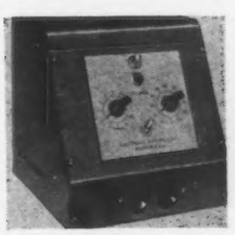
ally set up by simply manipulating rotary switches mounted on the front panel. The equipment is designed to meet the rigid requirements of industry, and all components have been carefully selected for conservative operation. Power for operation is obtained from a 110 v 60-cycle circuit.

Vibration Resistant Lamps

SPECIALLY designed incandescent lamps for marine, power plant and industrial equipment service where there is constant jar and vibration from heavy or high-speed machinery are available from *Sylvania Electric Products, Inc.*, Ipswich, Mass. Rated at 50 and 100 w, vibration resisting filaments for vertical lamp burning are designed to give 1000 hr life. Bulb types include clear and inside frosted, for 115, 120 and 125 v service.

Electronic Timer

ANNOUNCEMENT of an electronic timer suitable for applications requiring highly accurate circuit timing has been made by *Electronic Controls, Inc.*, 44 Summer Ave., Newark 4, N. J. The



time range is from 1 to 120 sec in increments of 1 sec, with accuracy better than 5 pct, it is claimed. A double receptacle permits timing

two circuits simultaneously. A dial switch is provided with a position for continuous circuit closure. The unit is compact, the cabinet measuring 8 x 8 x 8 in., and is supplied for 115 v ac operation.

Acoustic Control Unit

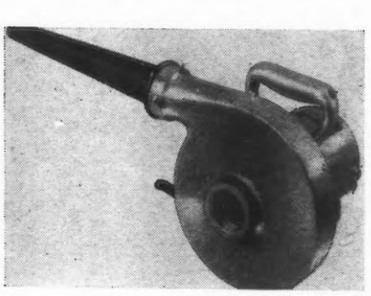
DESIGNED to absorb office machine noises at the source, Acoustors have been produced by the *Acoustor Co.*, 36-50 Pyatt St., Youngstown, Ohio. This advancement in office furniture provides a semi-private office for each operator, and gives, fluorescent lighting over the entire working area without keyboard glare or reflection, it is said. Work trays and lights have no distracting vibration. This company also manufactures a noise control phone booth said to shut out 60 pct of all plant noise. This unit is 26 in. high x 24 in. wide x 24 in. deep and can be placed on a stand or desk, fastened to a wall or any place where there is a phone.

Fluorescent Lights

LOUVERED 2-light and 4-light commercial Luminaries have been created by *Mitchell Mfg. Co.*, 2525 Clybourn Ave., Chicago 14. They have been designed to provide higher lighting levels and at the same time reduce glare and contrasting shadows to a minimum. The lamps have full-depth metal louvers and ceramic treated glass side panels and are said to shield the bare lamps at all normal viewing angles. Models are for surface or suspension mounting, singly or in continuous rows.

Electric Blowers

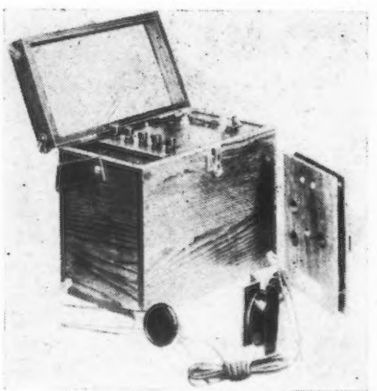
DOUBLE duty portable electric blowers have been designed by the *Ace Co.*, 12-40 N. Orange St., Ocala, Fla., for removing dust



from motors, machines and places difficult to reach by hand or compressed air. They are equipped with universal motors and can be supplied for any voltage from 100 to 275 v. Two speeds produce a powerful blast of clean, dry air that will remove dust, or at the flick of the switch, a gentler but positive blowing or suction action for light duty jobs. Suction and spray attachments are available for all models.

Cable Tester and Locator

CALLED the Stewart Cable Tester and Locator Combined, an instrument designed for the precise location and depth of buried pipe and cable, has been announced



by *W. C. Dillon & Co., Inc.*, 5410 W. Harrison St., Chicago 44. Besides telling where and how deep cable or pipe is buried, this device can check depth of cable at river crossings and is said to determine whether or not a service pipe is below the frost line in lowering or regrading thoroughfare. A lamp circuit checks all connections after the test has been set up. The unit is ruggedly built, portable, compactly encased for rough use and weather. It is 12½ x 7¼ x 11 in. high and weighs 22 lb.

Spring Lock Washers

USED to hold nuts tight on bolts in the numerous applications where vibration and changes in the form of the surfaces bolted together tend to loosen the joints, a line of spring lock washers has been produced by the *Reliance Div.* of the *Eaton Mfg. Co.*, Massillon, Ohio, in compliance with the standards adopted by the American Standards Assn. Known as American Standard spring lock washers and guaranteed to meet both ASA and SAE specifications, they are available in four series: light, medium, heavy and extra heavy.

Magnetic Shield

ADDED to a line of magnetic grip-shields manufactured by the *Dilley Mfg. Co.*, 10215 Euclid Ave., Cleveland 6, is a grip-shield made of 0.100-in. thick plastic, in sizes 10 x 12 in., 12 x 16 in. and 16 x 20 in. The shield is drilled with four sets of two holes and the magnet which comes separate and unmounted can be fastened in six different positions. This special magnet, 1¼ x 1¼ x 3 in. is said to be eight times more powerful than the standard horseshoe type used on small shields. This magnetic grip-shield was designed for use where greater area of protection is desired and where excessive vibration on large machines necessitates a more powerful magnet.

Safety Cuff

SAFETY gauntlet-cuffs that are said to afford big savings to users of the gauntlet-style industrial gloves, have been announced by *C. Walker Jones Co.*, 6135 N. Lambert St., Philadelphia 38. The Jomac gauntlet-cuff is a separate piece, an extra strong covering for the forearm. When gloves become worn, they may be replaced, retaining the gauntlet-cuff which fits snugly at the wrist around gloves.

Antivibration Mount

THE Vibrashock unit designed by the *Robinson Aviation, Inc.*, Teterboro, N. J., for the protection of delicate equipment, consists of a stainless steel spring of special

design with three-way freedom movement and built-in, three-way limiting snubbers furnishing a resilient stop to limit heavy shock loads. A damping system, a snubbing system and electrical bonding are integral and are contained in an aluminum housing of standard dimensions. The unit is said to average better than 90 pct absorption of vertical and lateral vibrations over a wide range of frequencies and is available in three standardized sizes, ready to install for load requirements varying from ½ to 45 lb.

WHEN

NORMALIZING CYCLES PULL VARIABLE LOADS ON THE ATMOSPHERE GENERATOR

REAL CLEAN ANNEALING OF BRASS STRIP COULD SAVE FINISHING LABOR

YOU WANT DRY ATMOSPHERES UNDER YOUR ANNEALING COVERS

THEN

KEMP "atmos gas" can be tailored to your process

The atmosphere gas generator you use should be *tailored* both to your process and to your procedure.

If you have a line of furnaces to be supplied by one generator (as in propeller blade normalizing) it's likely that your atmosphere requirement will be fluctuating—and you will want a generating unit which is equally efficient at 20% and 100% load—like a KEMP design.

If your process is continuous and your demand is high (as in brass strip annealing) you will want a unit which produces "atmos gas" at such low cost as 8 to 15¢ per M cu. ft. (amortization included)—which KEMP can do.

If water vapor must be removed (as in long-cycle high-temperature work) you will want a generator equipped with silica gel desiccating towers—such as KEMP engineers often build into a system.

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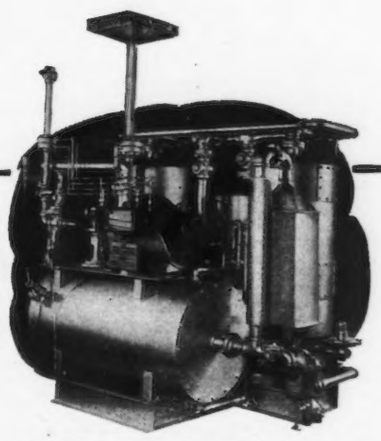

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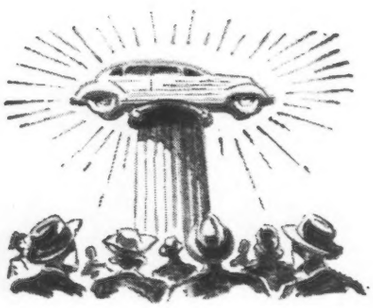
Assembly Line . . .

WALTER G. PATTON

• Great Lakes strike may have serious repercussions . . . Increase in car prices will have no immediate effect on car sales . . . Hudson tests car buyers' tastes.



DETROIT—The effect of the stoppage of ship movements on the Great Lakes will not be evident for several days but few observers here are inclined to minimize the potential damage that may result from the strike. It has been estimated by the union that, for example, as much as 80 pct of Detroit's steel and coal is delivered by water, that 60 pct of the city's supply of gasoline and oil is water-borne and all of the iron ore and limestone used in Detroit steel mills is delivered by boat. Even if these figures exaggerate the dependence of Detroit on lake transportation there can be no doubt that the present strike can have serious repercussions.

Obviously none of these particular commodities may become critical immediately because stockpiles already on hand should enable producers to carry on for several weeks at least.

What is feared, of course, is that the *wrong* things may be shipped by water. For example, if deliveries of hot-rolled steel for wheel rims or pig iron are among the items immediately affected, the maritime strike can be just about as devastating so far as the automobile industry is concerned as if not a single pound of material was moving by either rail or water.

Few outsiders realize how much the problem of manufacturing automobiles today has resolved itself into a matter of having on hand—every day—a sufficient number of *all* the thousands of parts required to build motor cars. Automobile companies have always operated with minimum inventories. The presence of only a few days' supply of many major components is not only standard practice but an operating aim. To maintain large banks of parts would tie up capital unnecessarily, greatly increase materials handling and warehouse charges and thus add an unnecessary financial burden to an industry which is already pyramiding costs far above the most pessimistic estimates that were made when the industry commenced to reconvert.

To put it another way: it is not the amount of tonnage that will be affected by the maritime strike, it is what tonnage is going to be cut off by shipping paralysis on the Great Lakes.

GENERAL MOTORS has indicated that the effects of the strike will probably be felt almost immediately; Ford has declined to comment which is understandable in view of the fact that two Ford ore carriers are currently involved.

Perhaps the most unfortunate aspect of the maritime squabble is that it comes at a time when considerable rail traffic has just been diverted to water shipment as a result of the freight car shortage. Because of this diversion it is probably true that the tonnage of Detroit raw and finished materials carried on the Great Lakes stands today at an all-time high.

A number of years ago, the Detroit Edison Co. and other firms started shipping coal by water from Toledo to Detroit to take advantage of a favorable freight differential. At the present time, all Edison coal, for example, is delivered by boat to the company's four steam power plants.

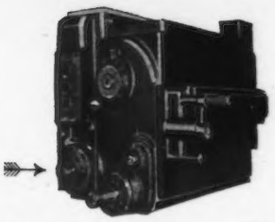
Similarly, steel produced in Pittsburgh is often shipped to Conneaut, Ohio, thence by boat to Detroit. While the major steel tonnage is reported to move here by rail, a very important and substantial tonnage arrives by boat and this includes shipments to nonintegrated mills which reroll the steel into finished products. It is at this point that the greatest pinch is likely to be felt, since a number of the automotive items made from the Detroit-rolled steel are among the most critical on the automotive lists.

Another important event of the past week was the automobile price boost, the fourth such hike since reconversion. According to OPA, the latest increase of 7.3 pct to restore dealers' peacetime markups brings 1946 ceilings to an average of 22.3 pct above 1942 levels. While many observers are inclined to feel that this latest increase will have an almost immediate effect on the potential market for new cars, it seems more realistic to adopt a "wait-and-see" attitude on this question.

WHILE it cannot be denied that every increase in the price of new passenger cars eliminates buyers from the market, it is equally true that at the present rate of delivery it will be a long time before these marginal buyers are reached who are currently dropping out of the market. As one spokesman for the automotive industry expressed it:

"There are still many people who are willing to pay 22.3 pct more in 1946 than they paid in 1942 for a motor car and we find new evidence of this every day. We would be the last to deny that we are losing customers every time the price of a car goes up. In fact, we are losing customers every time the price of most commodities goes up since the automobile industry is constantly competing with the housing industry, the food industry, the clothing industry and the entertainment industry for the consumers' dollar."

All we can hope for, he argued, is that by the time the present



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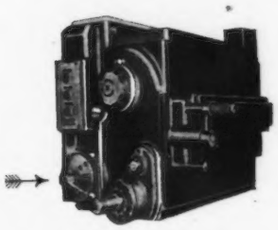

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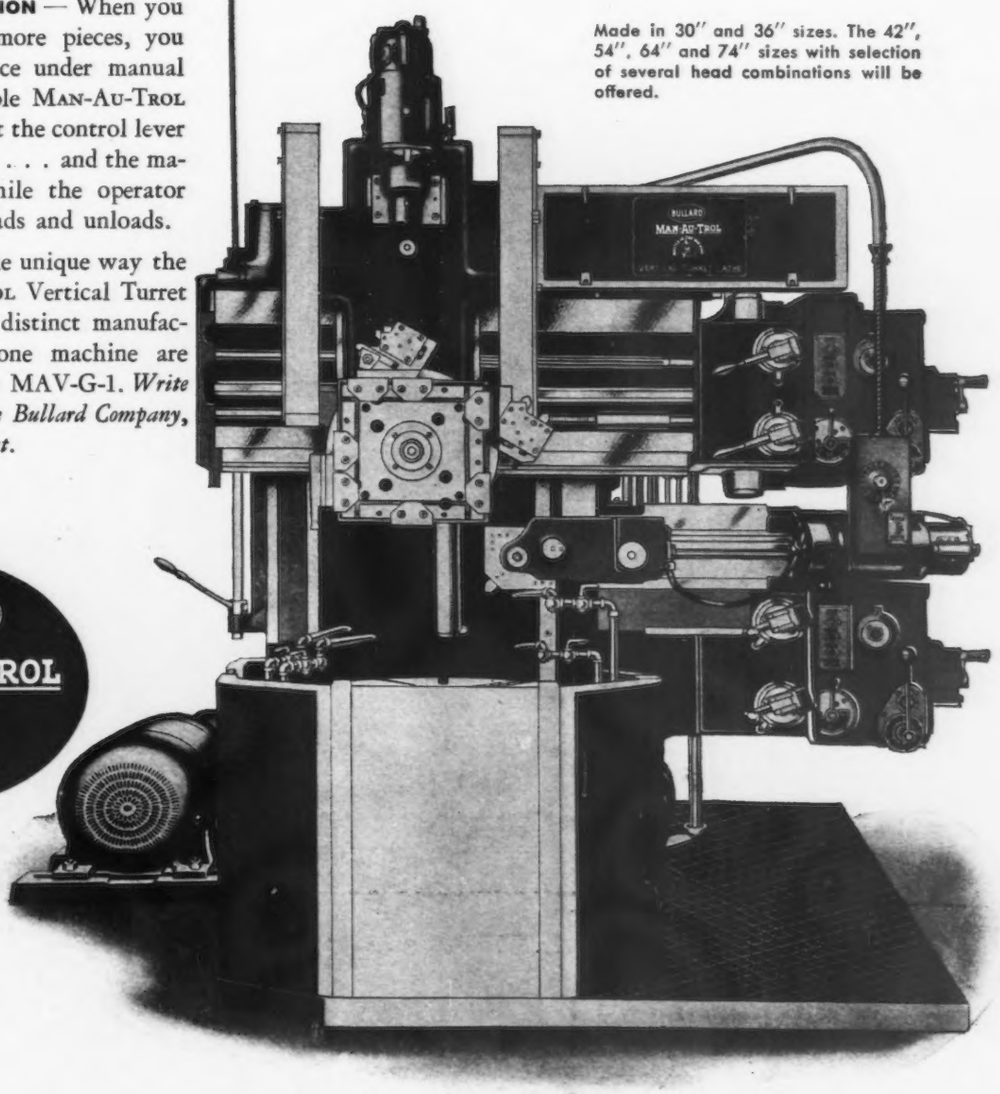

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BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

Car Prices Uncertain

Washington

• • • **The future of automobile prices is uncertain, as OPA is still considerably confused over the new law.**

A confidential OPA staff memo says that "it is very unlikely that the manufacturers will be able to form an advisory committee and get the necessary cooperation to obtain an increase under the so-called Barkley provision." This is the amendment which guarantees industry 1940 prices plus accrued costs since that time. There is also much apprehension over possible Dept. of Justice anti-trust prosecution if manufacturers start gathering cost and price data, as required by the OPA law. OPA is also taking stock of reports that the industry is not too keen about higher prices, since it is possible that they might price themselves out of a market.

Bruce R. Morris, OPA Automotive Price Chief, contends that "it now appears certain that automobile factories will not be able to obtain their 1941 volume during the remainder of the year, and therefore, it seems necessary that we provide some sort of individual adjustment in order to bail out the companies.

crop of buyers is satisfied, the automobile industry will have adjusted its production costs, its labor productivity and the types and prices of the products it makes to attractive levels which the public can afford.

"We have always been able to accomplish this in the past," he said, "and I still have enough confidence in the automobile industry to believe that we will again be able to meet any given set of price, product and production requirements that may confront us."

"In fact," he counselled, "our very survival depends on our ability to do just that."

WHEN Hudson production was halted on July 30 because of difficulties in suppliers' plants, it brought to a temporary halt an exceptionally fine record of automobile production by that producer. During the month of July, Hudson output established a postwar peak of 11,368 vehicles. The number of vehicles turned out since production began is 54,828.

During the month of July, Hudson employment of hourly workers had risen to a point where it exceeded Hudson's wartime hourly rated personnel mark. When production was resumed this week, scheduled output was 720 cars per day. The company is seeking 2000 additional workers.

It is probably true that no other industry expends the same amount of effort to measure customers' tastes in advance of production as does the automotive industry.

The latest survey of customer tastes in motor cars is significant because it contradicts a number of previous notions about automobiles.

For example, a recent Hudson survey showed that 72 pct of Hudson owners held high speed least important of ten factors to be considered in selecting a motor car. Ease of control, first cost, appearance, smoothness and pick-up were all rated ahead of high speed.

Men and women differ widely in their opinions about styling. With men, appearance rated only seventh as a factor influencing their choice of a new car while women rated appearance first, with dependability, comfort, operating economy, ease of control and smoothness following in that order.

Among the accessories offered by Hudson heaters, automatic shift, overdrive and radio were considered most desirable in that order.

One interesting result of the Hudson study is that only 29 pct of the Hudson owners covered in the survey indicated that price would be the deciding factor in their choice of a new car. Thus if the Hudson survey truly reflects the buying attitude of the public, recent increases in the cost of automobiles may not turn out to be so formidable a factor as many persons believe.

Reports Typical Auto Used 3500 lb of Steel

New York

• • • **Slightly more than 3500 lb** of steel was purchased for a typical 1942 passenger automobile, according to figures supplied to the American Iron & Steel Institute by a leading automobile manufacturer.

Of that total, approximately 2600 lb was sheet and strip steel. Next in amount was 613 lb of hot and cold-rolled bars. Steel wire products accounted for 187 lb, including 4 lb of wire products used in making five tires. Other products purchased for a passenger car were 45 lb of plates, 30 lb of shapes and 10 lb of pipe and tubes.

A recent survey indicates that sheet and strip capacity of the steel industry is today 1,000,000 tons greater than it was in 1941, the record year for production of those products. Furthermore, 2,500,000 tons additional sheet and strip capacity is expected to be built by July 1947.

About 8,775,000 tons of sheet and strip would be required to make the predicted maximum of 6,500,000 cars and trucks in 1948. The total amount of steel for that many units will be in the neighborhood of 11,500,000 tons, or only about 18 pct of the annual capacity for finished steel.

Packard Assembly Line Lag Costs $2.5 Million

Detroit

• • • **Packard's final** assembly line has been able to work only 58 days during the first 6 months of this year. As a result, net loss on factory production equalled $2,590,158. However, after income tax credit under the carryback provision and transfer of $419,956 to operations from a previously created reconversion reserve a factory net profit of $43,799 is reported.

Consolidated net profit of $749,517 for the first half of 1946 is shown in the company's 6-month financial statement. Reported earnings of $794,517 may be compared with $1,064,450 for the same period a year ago.

According to George T. Christopher, Packard president and general manager, these sharply reduced earnings reflect the after-effects of the steel, coal and transportation strikes in stifling the necessary flow of parts from vendor's plants.

Washington . . .

L. W. MOFFETT

• Revamped congressional machine simplifies legislative process . . . Affords opportunity for economies . . . CPA Chief predicts easing of steel situation after September.

WASHINGTON—Just as industry from time to time overhauls and rebuilds its machinery and equipment to expedite production and promote efficiency, the dying 79th Congress enacted into law a measure which provided the means for a comparable revamping job on the creaky and often cumbersome national legislative machine.

Devised to handle the simpler work of a day gone by, the legislative organization has mushroomed, largely through tacking on of new parts and pieces, until the whole resembles one of the complex machines dreamed up by cartoonist Rube Goldberg for performing simpler tasks.

A typical example is found in the growth of committees. In the Senate alone, the number had grown to 33 standing committees, 10 special committees, and no less than 67 subcommittees. Adding to the complexity, the loosely drawn jurisdictional lines resulted in different groups dealing with the same general subject; for instance, five committees were concerned with different phases of public land problems.

Several major changes in the legislative set-up have been effected under the Reorganization Act (S-2177). These include better pay, additional administrative and clerical help, substantial reduction in the number of committees, revamping of the ponderous appropriations and other fiscal procedures, and provisions for keeping a close watch on how newly enacted laws are administered and executed.

* * *

ON the theory that better pay would attract high caliber candidates, pay was upped from $10,000 to $15,000 per annum; also, provision was made whereby a member who had served 6 yr or more would be enabled to draw a pension, modeled along Civil Service lines, beginning at the age of 62 and based on the length of service. Of the annual salary, $2500 is considered as an expense allowance, exempt from taxation, leaving the average member around $10,000 in take-home pay.

In addition to creating a stenographic pool on which members may draw during peak correspondence periods, members are each provided with an $8000-a-year administrative assistant to conduct departmental business for the congressman and his constituents, leaving the bulk of his time free for his legislative job. Committees are to be provided with adequate, trained research and analysis staffs.

Reorganization of the committees is perhaps the most important part of the Act since public laws are largely made in committees, the chambers necessarily depending upon the committees to determine and bring out everything of importance in connection with specific legislation. Under the former setup, some of the abler lawmakers found committee assignments so heavy that they were unable to attend many meetings except by proxy and could appear at chamber sessions only when most critical legislation was under debate.

Committees in the Senate have now been reduced from 35 to 15 and in the House from 48 to 19 by consolidating some and abolishing others which had outlived their usefulness. For instance, the Committees on Public Lands and Surveys, Mines and Mining, Territories and Insular Affairs, Irrigation and Reclamation, and Indian Affairs have been merged into the new Public Lands Committee (Senate). Of equal importance is the provision that except in specified instances, no Representative may serve on more than one committee and no Senator on more than two; only with specific permission of Congress may a committee meet during a floor session of the respective houses.

ALSO of importance is the provision which strengthens the control of Congress over appropriations and other fiscal matters. In the past, after appropriations had once been made, Congress too often was forced to sit helplessly by while other branches transferred and mingled funds, brought forward or backward unexpended balances and otherwise juggled money for purposes never intended by Congress, incurred deficiencies, etc. Under the new Act, not only are transfers between appropriations and reappropriation of unobligated balances specifically forbidden (except public works), but subcommittees are provided with trained investigators or "specialists" to keep an eye on such matters.

Armed with power of subpena and adequate "specialists," the committees are authorized to conduct a continuing review of administrative practices and fiscal matters to determine whether the judicial and executive branches are administering the laws in accordance with the intent of Congress.

Included in the Act is an obscure but much needed reform. For years, Congress has been flooded with private bills introduced by congressmen under pressure by constituents seeking payment of small claims in tort (damages other than breach of contract), individual pensions, authorization for construction of bridges, etc. In each of the past five Congresses, around 2000 such bills involving total claims or costs of $100,000,000 were dropped into the hopper. The Act abolishes the Claims Committees and forbids introduction in either house of bills seeking settlement of

A NEW GRINDING MACHINE BY CINCINNATI

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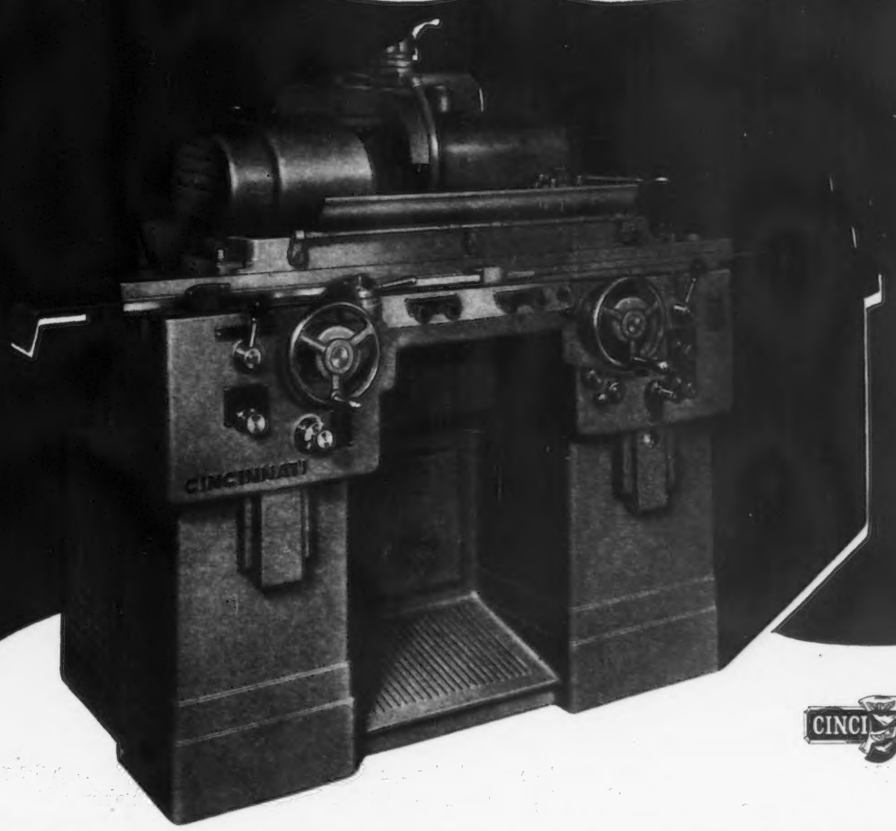

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claims, pensions, bridges or other matters of purely private or local nature, thus closing the door to one of many ways of raiding the Treasury.

The program is expected to add $12 million annually to the national legislative cost. Whether this is justified or offset by shorter sessions and machinery provided for effecting economy lies with the future. Legislation will not reform Congress, but it provides the means for it to reform itself; the rest is in the hands of the voters.

* * *

WHEN it comes to devising methods of increasing industrial production, government economists are often completely void of practical ideas. CPA Chief John D. Small, who has a habit of putting his foot in it where the New Deal bright boys are concerned, recently put his finger on the only possible solution. Mr. Small said that while the ceiling is being reached on overall production due to a shortage of manpower, this production "can't give us a tremendous amount of additional stuff unless we get more productivity per manhour." He says that, in his opinion, productivity will improve, but there was a note of doubt in his voice when he made the statement. Some observers remarked that Mr. Small has made stronger statements.

Some months ago, Mr. Small sent the labor boys scurrying for the White House with demands for his removal when he stood almost alone in his belief that wages could not be increased without compensating price rises. Proven accurate, as a result of the coal and steel strikes, the CPA boss has earned the undying enmity of the CIO.

According to Mr. Small, the newly-revised OPA will not have any substantial effect on industrial production, at least in regard to stepping up output. Basically, the answer is for labor to keep the bit out of its teeth for the next six months, says Mr. Small. In the event this unlikely development transpires, he believes that major shortages will be eased, and prices might begin to break, but not on basic materials.

* * *

JULY industrial production will be above or about equal to the peak prewar month, according to preliminary CPA estimates. This output is being achieved by about 58,000,000 employed workers, or very close to "full employment," and with plenty of jobs available, the obvious answer is increased productivity. There is little likelihood of an easing in the labor market, Mr. Small went on to say, and "there will be a growing tightness into the fall."

The CPA Administrator says that through September, "all industry is going to be extremely short of steel because inventories have been drained. It means that the entire metalworking industry is going to be short of steel and in hardship to some degree. It isn't possible for CPA to wave a magic wand and get more steel, and the mills are trying to spread what steel they have as thinly and as equitably across all industry to keep as many plants running as they possibly can. If you operate one metal-using plant at maximum capacity, it has to be at the expense of another that shuts down."

In regard to when CPA expects the steel shortage to end, Mr. Small said that he could not say "specifically that it is going to end at the end of September; but I think we are going to be in a tight steel position, definitely tight, through September, and then it will grow easier, but not much easier through the fall. It is going to be tight all the way through the year, but not as tight as it is today."

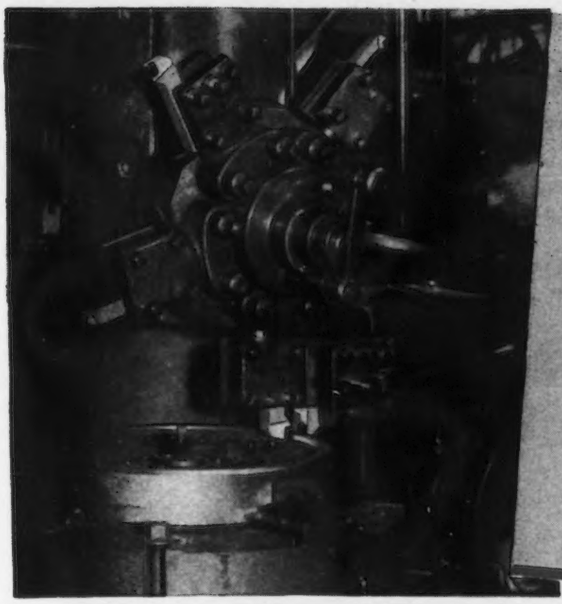
* * *

HIGH enemy plane speeds and heavier armor of the future have made it imperative to develop new aircraft weapons. The cannon now in the process of development will feature small silhouettes and light weight formerly believed impossible to achieve.

They will be capable of firing armor-piercing and explosive projectiles at the high rate for cannon of 1500 rounds a min which velocities double those now available. These cannon are designed to destroy any airplane, sink lightly armed ships, and to be employed against ground targets.

Army Ordnance is proceeding with the development of automotive engines that will have twice the power of those used in World War II. The application of the gas turbine to heavy tanks is under consideration. Future engines, and improved transmissions such as the cross-drive that will permit a tank to turn in its own length, are expected to revolutionize tank performance.

THE BULL OF THE WOODS — BY J. R. WILLIAMS



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A midwestern manufacturer of Diesel valves switched to Carboloy* Standards for machining the interiors of valve heads. A far smoother surface finish was obtained—the polishing operation was completely eliminated, with a big saving of time—and tool life was increased by 10 times.

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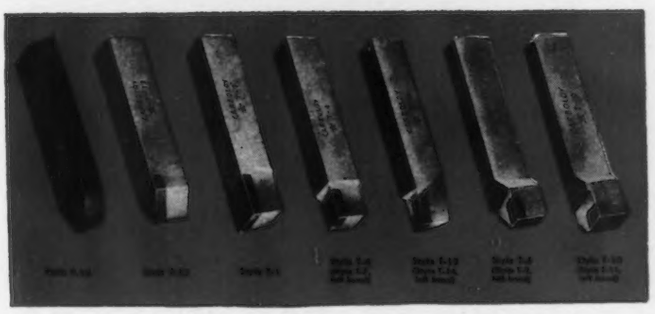

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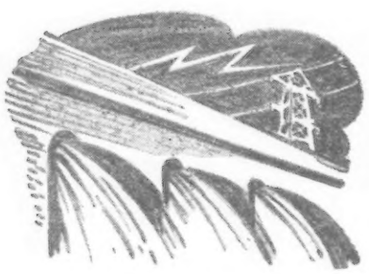
West Coast . . .

ROBERT T. REINHARDT

• Portland area ignores previously predicted slump as industry broadens its base . . . "Packaged" manufacturing plants may solve foreign production problems . . . Plea made for lower aluminum freight rates.



PORTLAND—A year after the original VJ-Day this city, which produced hundreds of merchant and fighting ships to help bring about that victory, is trying to find out just what has happened to prevent collapse of the economic structure built on its shipyards and warborn industries. The misgivings which were evident at war's end have given way to wonderment at the complete recovery effected without a major upset in employment.

While manufacturing employment in May 1945 was 302 pct above the 1937 prewar level, it is estimated that employment in this category today is still between 16 and 18 pct above the 1937 level. A year ago it was not difficult to find crystal gazers willing to prognosticate a level of employment much lower than that of the prewar era. The explanations given by industrialists in a position to know include the departure of thousands of imported workers and the development of new industries. Which of these two factors is the more important is difficult to determine although it is conceded that departures from these parts have been at least as high as surveys made during the war indicated they would be. At any rate it is reported that unemployment in the Portland area is approximately 23,500 including 6300 veterans and 4000 women, which is lower than the 1940 level.

Metalworking industries, which developed or expanded during the years they were producing components for ships, are determined not to lose their gains. Many of these operations grew from payrolls of 10 or 25 men to more than 200 under the press of war. To maintain these larger operations structural steel fabricators, sheet metal shops and foundries have turned to production of automobile trailers, kitchen ware, boats and home appliances. Everywhere shops crowded with machine tools and men are either actually increasing the size of the plants or looking about for the opportunity to do so.

If an unlimited supply of steel and electric and gasoline motors should suddenly become available along with a thousand or so skilled machinists, Portland would soon take on once again its full rush and bustle of wartime days, according to almost any businessman you meet.

AS in every part of the country, Portland's housing program is bogged down awaiting materials. It is reported that at present approximately 4000 homes stand incomplete for the lack of a few essentials such as nails, lumber and plumbing supplies. Even cement is reportedly being sold on the black market at four times its ceiling price and nails are said to change hands at an even higher premium.

Foundries here are working at capacity while scouring around for good steel scrap. The huge tonnages which once flowed their way and into western openhearths are getting tighter by the day with the only bright spot being the possibility of building up inventories from shipbreaking activities. Three 8800-ton vessels are being broken up at nearby Port Kalama, Wash. However, there is a possibility that the hulls will not be torn down, but sold by the wreckers as hulks for breakwaters. One ex-foundry operator here is the proud possessor of 10,000 tons of excellent ship plate scrap which he frankly admits he is holding for better prices. About 7000 tons has already been prepared for electric furnace charging.

•

Many women in California appear to prefer factory production lines to the kitchen at home. The "demobilization" of local war industries has sent many home, but figures released by Paul Scharrenberg, director of the California Dept. of Industrial Relations, indicate that considerably more of them want to stay on the production line than did in prewar days. The number of women employed as production workers appears to be stabilizing well above the pre-Pearl Harbor figures. Iron and steel plants, nonferrous metals and products, machinery and electric equipment industries are among those holding a percentage of women workers substantially above their prewar level. However, the shipbuilding industry has dropped from the wartime high of 41,000 to only 300. The aircraft industry retains 8400 of its all-time high of 10,000 women workers; in June 1941 only 1500 were employed.

SALT LAKE CITY—The 25 pct rate increase on aluminum sought by the railroads would seriously affect Pacific Northwest production of The Permanente Metals Corp., A. P. Heiner, general traffic manager for the company, testified at the regional ICC hearing here.

Mr. Heiner took the position that the rate schedules proposed by the carriers would greatly weaken Permanente's competitive position, both with respect to other aluminum producers and steel. He pointed out that with its alumina plant located at Baton Rouge, La., its pig producing plant at Mead, Wash., its rolling mill at Trentwood, Wash., and its market largely in the East, the Permanente setup is particularly vulnerable to straight percentage rate increases. He implied that the imposition of such increases as proposed would force the company to realign its plant setup for the purpose of displacing rail transportation.

Mr. Heiner complained that

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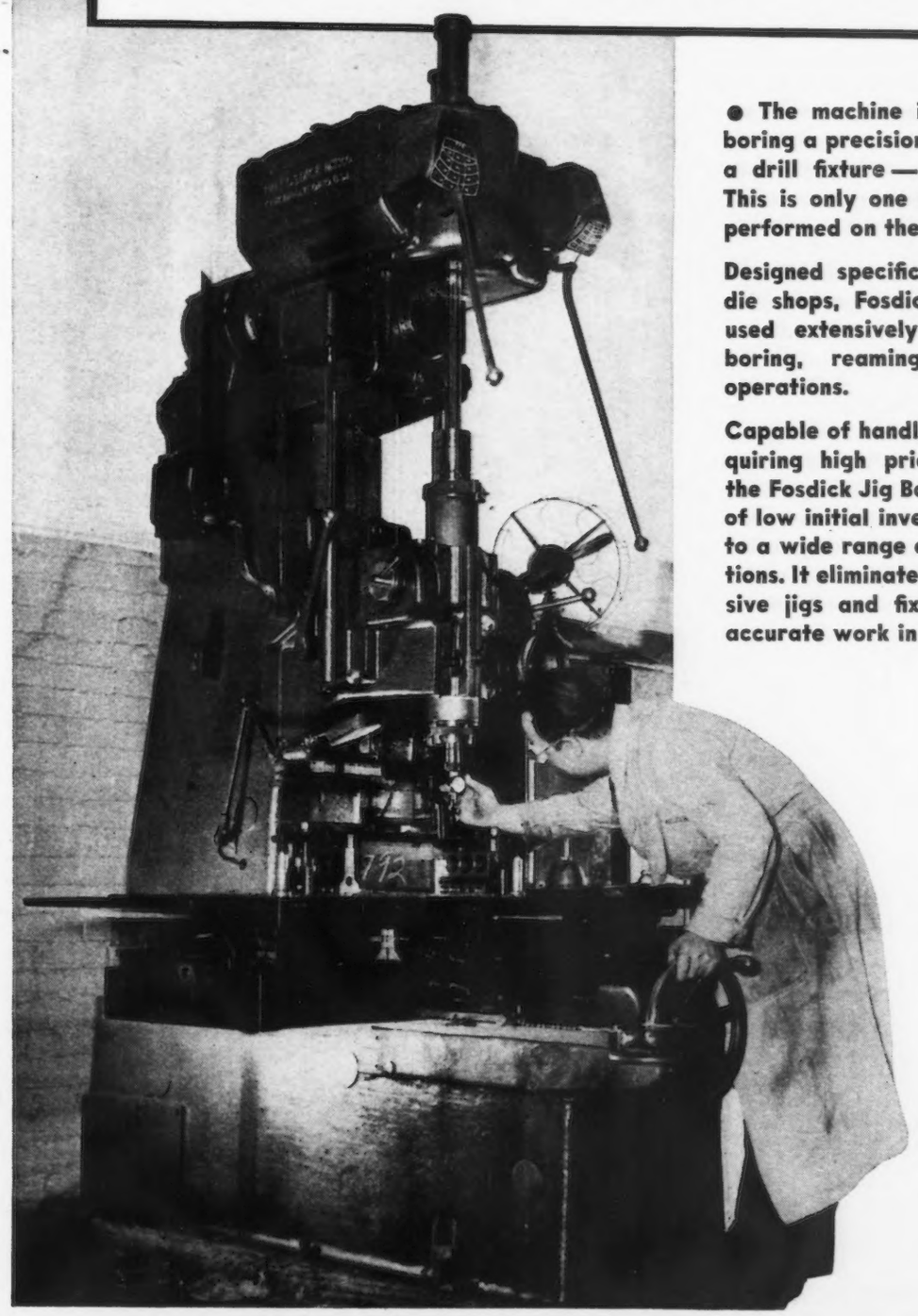
FOSDICK JIG BORER



● **The machine illustrated is set up for boring a precision hole .3125" diameter in a drill fixture — material machine steel. This is only one of five operations being performed on the work by this machine.**

Designed specifically for tool rooms and die shops, Fosdick Jig Borers are being used extensively for precision drilling, boring, reaming, facing and similar operations.

Capable of handling many jobs usually requiring high priced precision machines. the Fosdick Jig Borer offers the advantage of low initial investment plus adaptability to a wide range of close tolerance operations. It eliminates the necessity for expensive jigs and fixtures for production of accurate work in smaller quantities.

Consult Fosdick on your precision operations perhaps they can help you reduce costs on some of your work. Fosdick Jig Borer Bulletin J. B. I. available upon request.

FOSDICK MACHINE TOOL COMPANY
CINCINNATI 23, ··· OHIO

whereas the carriers had proposed special adjustments in order not to disrupt competitive relationships in the steel and other industries, they had completely ignored this principle in seeking the full 25 pct increase on aluminum. He cited as one example the proposed increase of 80¢ per ton on westbound steel from Chicago to the Pacific Coast as against a $7.20 increase on eastbound aluminum plate and sheet from Trentwood to Chicago.

"The prejudice to aluminum," he commented, "is obvious. The burden of the increased costs of transcontinental railroads would be borne to the extent of 80¢ per ton by the commodity steel and $7.20 per ton by the commodity aluminum . . . It is a safe generalization that the one commodity with which aluminum sheets are most competitive is steel."

Citing the effect the percentage increase would have on Pacific Northwest aluminum in competition with other production, he pointed out that the per ton increase to Detroit would be $7.20 from Trentwood, $3.40 from Alcoa, Tenn., and $2.60 from Chicago. To New York the increase from Trentwood would be $8.40, from Alcoa $4.00 and from Chicago $4.60.

The witness did not criticize the special adjustments proposed for the steel and other industries. His argument was that similar treatment should be given aluminum moving from the Pacific Northwest.

•

Utah's legislature, in special session, approved submission to the electorate this fall of two constitutional amendments designed to spread mine, utility and railroad taxing values over the state for school purposes. The amendments, if approved, will commit the state to finance 75 pct of a minimum school program of $3000 per class room unit. The program will impose the heaviest tax increase (about $750,000) annually on the Utah Copper Co. Under the present setup Utah Copper, because of its large assessed valuation, can finance the local school district with a comparatively small tax levy. But under the proposed program the school levy would be uniform throughout the state, unless some of the districts choose to pay a higher rate and boost their program above the minimum.

A proposed constitutional amendment to open the way for a production tax on oil, gas, hydrocarbons and other minerals was passed unanimously by the house but rejected by a large majority in the senate. Factors contributing to its defeat in the senate were: The feeling that it would be psychologically bad with extensive oil explorations now underway in the state; the fact that any oil discoveries could be taxed under the ad valorem or occupation system without constitutional amendment; the conclusion of some of the school lobbyists and senators that the oil tax amendment would widen the opposition to the school financing program next November.

WAA Initiates Multiple Tenancy for Plants Too Large for Single Units

Washington

• • • **Surplus plants too large** for peacetime operation as single units are being subdivided and sold or leased for use by small businesses under WAA's "multiple tenancy" program.

The program includes the following properties: Bechtel-McCone Aircraft Modification Plant, Birmingham; Consolidated-Vultee Aircraft Corp., San Diego; Aluminum Co. of America, forging plant, Cannonsburg, Pa.; Basic Magnesium Corp., Henderson, Nev.; Coosa River Ordnance Plant, Talladega, Ala.; and Illinois Ordnance Plant, Carbondale, Ill. Other properties will be added as they are deemed suitable for "multiple tenancy."

Some progress has already been made in disposing of these plants. For example, the Coosa River Plant has been sold to the Coosa Valley Development Corp., sponsor of a multiple industry project designed to include various manufacturing industries.

The Real Property Disposal Board, a part of WAA, has also approved leases of portions of the basic Magnesium Corp. plant to six concerns, including the U. S. Vanadium Corp., Hardesty Chemical Corp., Stauffer Chemical Co., and the Western Electro-Chemical Co.

Sales or leases of portions of the Consolidated-Vultee plant have been made to seven concerns. Included are buildings 2 and 4, including about 48 acres of land, sold to the Bobbi Motor Car Corp., and building 18 leased to the Superior Heating and Ventilating Co., San Diego.

To strengthen the position of small business in the acquisition of surplus industrial property, WAA revised Regulation 10 to grant the RFC an acquisition priority second only to that of federal agencies which desire the installation for their own use. Purchases made under this regulation, which does not invalidate options or rights of the wartime leases, will be paid for by RFC. A revision of Regulation 5 provides similar authority for the acquisition of non-industrial real property by RFC for resale to "small" business.

The following plants are being considered for future "multiple tenancy" use:

Alcoa aluminum forging plant, New Castle, Pa.; Arkansas Ordnance, Jacksonville, Ark.; Boeing Aircraft, Renton, Wash.; Consolidated Vultee Aircraft, New Orleans, La.; Dow Magnesium Corp., Marysville, Mich.; Evansville Ordnance, Evansville, Ind.; Green River Ordnance, Dixon, Ill.; Oklahoma Ordnance, Pryor, Okla.; Rohr Aircraft, Chula Vista, Calif,; and Sangamon Ordnance, Point Pleasant, W. Va.

SAE to Hold Tractor Meeting at Milwaukee

Milwaukee

• • • **Engineering requirements** involved in the design, manufacture, and utilization of farm tractors will be considered in the SAE National Tractor Meeting scheduled for Sept. 11 and 12 in the Hotel Schroeder at Milwaukee. Program for the meeting provides for discussion of power requirements of tractors and combines, factors affecting tractor efficiency, economics of diesel tractor engines, and tractor mounted equipment.

Both morning and afternoon sessions will be held. Principal dinner speaker will be Fowler McCormick, chairman of the board, International Harvester Co., Chicago. The title of his address is, "New Horizons for Agriculture."

Research Man With A Loose Foot

The Armco research man is no homebody. This sheet steel specialist is always on the move—visiting designers and manufacturers of buses, streamlined trains and planes, television equipment, and new steel products for home and industry. And he takes his research skill along—works right in the plant with the men who make the products.

Knowledge gained this way helps Armco tailor sheet steel to a particular need—to route scores of different orders through the mill departments for individual processing.

Out of this teamwork between Armco and the manufacturer have come many ideas for improving fabricating methods and cutting manufacturing costs. Also ideas for such special-purpose sheets as ARMCO PAINTGRIP that takes and holds paint, Ultra-thin Electrical Steels, new Aluminized steel and others.

SPECIAL PURPOSE ★ ARMCO ★ SHEET STEELS

Back of this fact-finding in the field stand the modern laboratories of The American Rolling Mill Company. These laboratories, which had their beginnings 45 years ago, give Armco the oldest and largest research organization in the field of special-purpose flat-rolled steels.

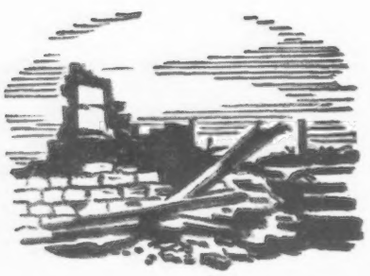
The days ahead will bring even greater demand for versatile sheet steels. Armco research, working closely with the men planning new products, can be counted on to develop the special sheet steels to do the job—and do it best. The American Rolling Mill Company, 3161 Curtis Street, Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION

THE AMERICAN ROLLING MILL COMPANY

European Letter . . . JACK R. HIGHT

• Labor more pressing problem than coal in German steel production . . . Ingot rate at 2.3 million metric tons . . . 4.3 million is immediate goal.



DUSSELDORF, GERMANY—Traveling in the British zone of Germany offers a number of contrasts to the American occupied section. Most startling of these is the emphasis on conservation of food. With strict rationing in effect in Britain, and the lowest German ration effective in the British zone, this care is understandable. The result is that if I am staying, as I am, in billets here in the city, and visiting plants in the Ruhr, I must carry haversack rations for my noon meal, as no one but my own hotel will feed me.

As far as the steel industry itself is concerned, there is much of interest to note, although the total production remains on the level of about 2.3 million metric tons of ingots per year in the British zone. Following a nine-month period when solid fuel has been the most trying bottleneck, the steel industry is now passing into a phase when a pressing labor shortage will be the controlling factor on production. Coal allocations for the third quarter are a little higher, and a high British administrator tells me now that if the industry got much more coal they would be embarrassed with it.

There are today about 175,000 employees in the steel industry, including the ore mines, and present estimates are that 75,000 more will be needed by the end of 1946. The need for more workers is accentuated by the fact that the average worker's age is 10 to 14 yr higher than it was before the war. For the most part the young men have not gotten back to the steel industry. The coal mines have the first priority on young, able bodied men in the British zone, so the steel mills are moving along on what they had during the war, less those persons who have been "Denazified."

The food shortage also reduces the amount of work that each man does in a day. These factors in combination lead military government officials to suggest that output is less than 50 pct per man hr than before the war. In none of the mills that are in operation is there sufficient manpower available for full three shift operation.

In most cases aside from blast furnace and steel plant departments the practice is to alternate operations in various sections to take maximum advantage of the available labor and power, which is also short.

THE absentee problem remains large, as the men like to take off on Friday for their weekend food foraging trips. There is much of this type of travel in evidence in Germany today. I have noted hundreds of men, women and children in a modern day exemplification of the "gleaners," going over already threshed wheat fields to pick up what has been dropped. The German civilian trains, made up mostly of badly battered third class coaches, and a few not-so-bad seconds are crowded from Friday to Tuesday with civilians searching for food.

The technique is not strictly a raiding operation. In a great many cases the people have some relative or friend who lives in the country. They go to visit, and hope to get some potatoes or a little bacon. I rode some of those trains this week, and I am sure that many hundreds of the travelers are successful. I have crawled over countless burlap bags of potatoes, apples, some melons, here and there a squirming one that emitted the unmistakable sounds (and bouquet) of pigs.

Efforts are being made to scale steelworkers upwards in the matter of extra rations, and this will probably be accomplished in the near future. The mills generally try to give the workmen one hot meal per day, but this program is only meeting with moderate success. When the system is in operation the workman turns in to the manager his coupons for extra rations, and the firm uses them for purchases. There is considerable difficulty in procurement on this scale, and in most cases only a part of the workmen are thus served.

The ore supply problem has worked out better than most German steel men expected, probably entirely because of the low scale of operations. British officers feel that the shipments of German ores, mostly from the Salzgitter area, which make up all of present consumption, will be adequate to cover up to 4.3 million long tons of ingot production per year. This figure represents the immediate production target as far as British officials are concerned, and depends upon the recruitment of 75,000 new workers, as previously discussed, as well as on fuel allocations.

For the month of July, 28 steel ingot production plants were in operation. The British statistics list separately 57 rolling mills and forges in operation, but there is some duplication in the two figures.

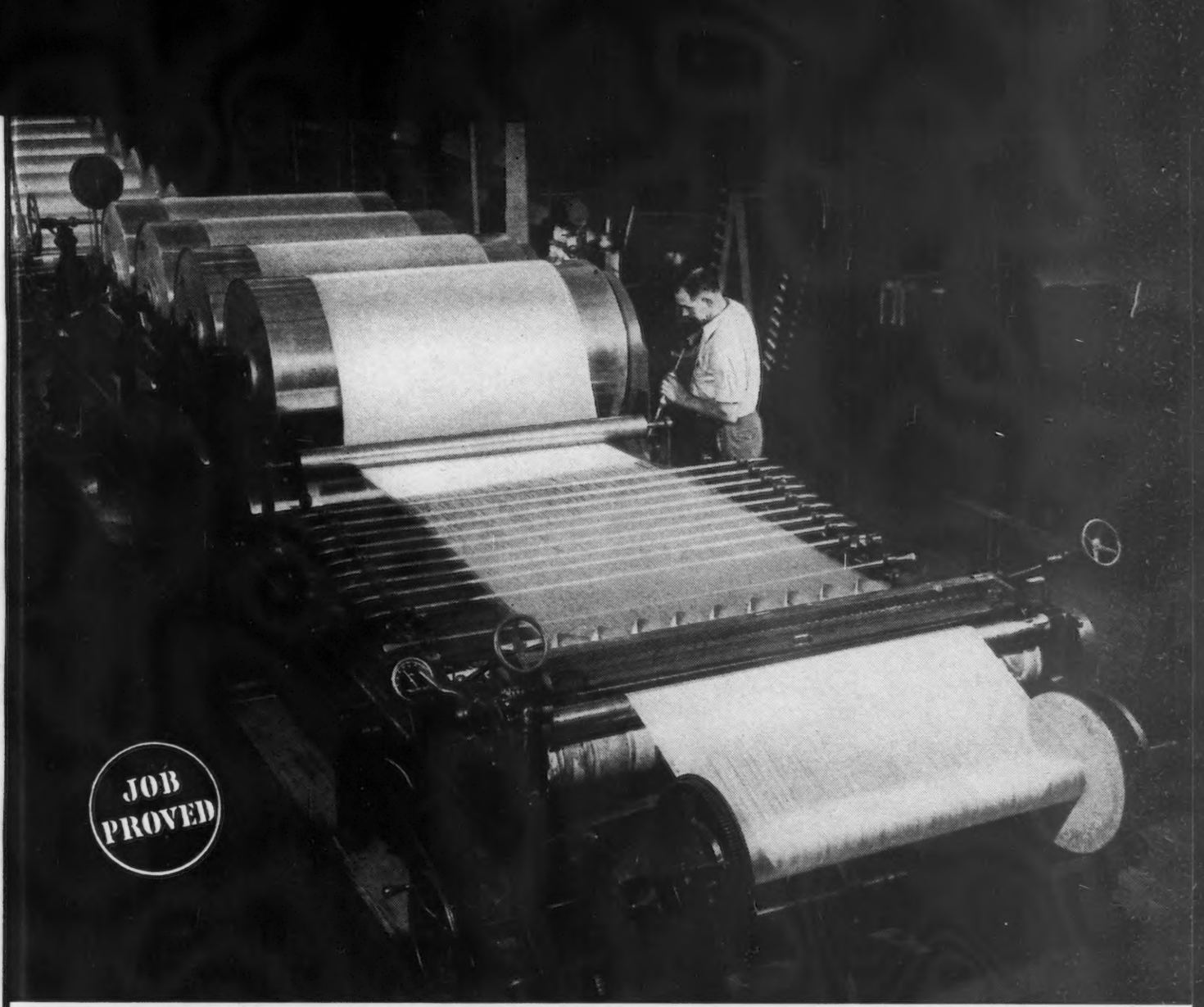
THE accompanying table summarizes steel production in the British zone for the year to date:

Production in the British Zone of Germany

Month	Pig Iron	Ingot Steel	Finished Hot-Rolled Products
January	143,316	136,322	106,086
February	152,590	166,512	117,229
March	166,046	185,800	127,351
April	141,650	160,467	119,682
May	142,255	174,246	155,948
June	138,566	180,082	161,853
July*	150,000*	188,752*	194,660*

**Scheduled-actual production will probably be slightly higher.*

There has been in the past year considerable juggling of plants in and out of production, possibly due to the need for using up existing stockpiles of materials. The lack of a central planning author-



LUBRICATION COSTS *Slashed 50%*

SUN LUBRICANT...

Ends Problem of High Grease-Consumption in Textile Mill

Grease costs were cut in half; maintenance procedures were simplified and reduced, when a Sun Engineer tackled the lubrication problems of this big Eastern mill.

Excess feeding of lubricant had been their experience before using Sun products . . . equipment was not being efficiently lubricated.

Waste stopped and adequate protection of bearings was assured when the Sun Engineer recommended a Sun grease specially prepared by Sun for the particular conditions of operation.

Sun lubricants have proved of value in hundreds of actual cases like this. For mills, factories or mines . . . for power plants, machine shops, production lines . . . for quenching tanks or stamping dies . . . wherever petroleum products are used in your business call on the Sun Engineer near you for "Job-Proved" Sun products. They assure longer machine life, lower operating costs, more continuous production.

SUN OIL COMPANY • ***Philadelphia 3, Pa.***
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INDUSTRIAL PRODUCTS

ity in control of permits may also have contributed to this juggling. The permits from military government which allow any particular business to restart were first granted after requests from the firms involved locally, and in some cases were granted by local and regional control authorities.

The new German administrative organization which does the overall planning for the industry under British direction was only recently established, and is still undergoing evolutionary development, so there has had to be certain readjustments in the production facilities. German steel price levels were frozen by government decrees at about 1934 levels, and the result was that on a number of merchant steel products and certain types of sheets and plates, the firms were actually taking a loss. When they set about getting permission to reopen their facilities after the end of the war, German sources tell me that there was a rush to put the profitable items on the market, while production of necessary but less lucrative items lagged.

The present group of firms, however, are considered by British authorities to represent a well-balanced production group, and it is doubtful if any unit now in production will be closed down. There will be new plants added to the list as the overall production is expanded, but the British occupation staff is avoiding possible argument from any source as to the wisdom of their choice by withholding the list.

Following the arrest of several score of the most important leaders in the German armament industry last year, the steel industry, as well as all others has been going through a difficult period, while all supervisory employees are subject to de-nazification. There have been great numbers removed from every industry, and there are going to be more in the future.

IT is a difficult job, because of the literally hundreds of different Nazi organizations that existed before and during the war. Activities in just one are sufficient to debar a man. The job is a slow one, because every effort is being made to work no injustice. The work is primarily out of the hands of the men who administrate the steel industry, and most de-nazification work is done on a community level. There is in every community a committee of Germans, made up of representatives of every political complexion that is permitted in Germany. If any man is guilty of Nazi activity, or what is more discouraging, even if anyone wants to claim that he was, he is given a voluminous form to fill out, that gives his entire personal history, asks for character witnesses, and references, and may come back in hundreds of pages. If he is not satisfied with the edict as handed down, he has an appeal open to him, and can go as high as the regional military government commissioner for the district in which he lives.

Appeals are acted on with full legal advice and in the traditional manner of English law. The reviewing authority may ask for additional evidence, and review cases come into court looking like volumes. When a man is barred as having a Nazi record, he is automatically fired, his bank account is blocked, and he is generally in the soup.

In practice, the occupation authorities have found that they cannot bar every man who was a member of the Nazi party, although this was the original objective. As far as the steel industry is concerned, nominal party membership does not necessarily bar a man, but if he took any active part in organization affairs, or held any office in them, he is out. In some cases the steel industry administrators are stepping into the proceedings with appeals when key men are involved.

One of the big problems now is that as political activity becomes more intense in Germany, the trail of the Nazis gets colder and colder. About the only people in Germany who can condemn the Nazis out loud are the communists, and thus there is a possibility that the communists may use the opportunity to conduct an official purge. Because evidence that is completely reliable becomes progressively more difficult to find, about the best thing that an industrial man can do in self-defense if accused is to get a recommendation from the trade union in his plant which says that he was a good boss.

Czech Iron Production Is Climbing Steadily

London

• • • **Czechoslovakia's** output of iron is steadily increasing month by month, so that in spite of the limited number of blast furnaces now in operation some units have already reached their prewar production level. During the past few months production of raw iron and steel, in tons, has developed as follows:

	Raw Iron	Raw Steel
January	62,137	105,338
February	69,088	114,742
March	82,145	140,674
April	82,729	142,577
May	90,951	146,746

It is hoped to increase the present production of iron by 25 pct, but the principal problem is the supply of ore and coke. Recently the Czechoslovak smelting works have been able to obtain supplies of ore sufficient for present requirements, but owing to its poorer quality its smelting requires considerably greater quantities of fuel than before.

Conditions are expected to improve in the near future, as there is a considerable quantity of Swedish ore already at Hamburg and other routes for supplying ore to Czechoslovakia will soon be opened.

German Patents Available

London

• • • **A conference** was recently held in London to consider the question of the future treatment of German-owned patents in Allied countries, and it was unanimously agreed that in no circumstances shall any such patents within their territories revert to the former German owners.

As a result of the discussions at the conference, the representatives of France, the Netherlands, the United Kingdom and the United States have signed an agreement making all patents of former German ownership now controlled by their governments, in which there is no existing non-German interest, available within their respective territories to all nationals of the countries party to the agreement without payment of royalties.

PERSONALS

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• **W. H. Walter** has been appointed chief mechanical engineer of American Bridge Co., Pittsburgh, U. S. Steel subsidiary. He succeeds **C. G. Baumgartner** who has retired after 41 yr with the company. Mr. Walter began working during the summer months at the company's Pencoyd plant in 1910. He later went with the Ambridge plant of American Bridge, where he was assigned to the Heroult electric furnace dept. in 1917. In 1937 he was made assistant mechanical engineer. Recently he was project engineer on research and development of hermetically sealed containers for the long-term storage of artillery materiel.

• **George H. Greene,** assistant chief engineer of the Lackawanna, N. Y. plant of Bethlehem Steel Co., has been made chief engineer of the Steelton plant at Steelton, Pa., effective Sept. 1. He joined Bethlehem in 1926 and was assistant chief engineer at Lackawanna since 1940.

• **L. F. Emigholz** has been made sales manager of the new Pallet Div. at Union Steel Products Co., Albion, Mich. During the war years Mr. Emigholz was in charge of the materials handling basket line.

• **W. E. Jones,** who has been associated with Diamond Alkali Co., Pittsburgh, for 30 yr and has been treasurer of the company for the greater part of that time, will resign effective Sept. 1.

• **B. A. Chapman,** staff engineer, has been named assistant to the vice-president in charge of manufacturing of Nash - Kelvinator Corp., Detroit. Mr. Chapman joined Nash Motors Div. of Nash-Kelvinator Corp. as plant engineer of the company's Wisconsin plants in 1937. During the war he was in charge of plant engineering for the corporation's Propeller Div.

• **Wilfred H. Roy** has been named assistant to the general production manager for Rheem Mfg. Co. and will make his headquarters in New York City. He joined Rheem at the company's Stockton, Calif. plant in 1942 and most recently has been staff assistant at the South Gate plant.

• **Melvin Shaulis** has been appointed assistant superintendent of the Brier Hill blooming and round mills of Youngstown Sheet & Tube Co. at Youngstown, Ohio. Mr. Shaulis, who joined Youngstown Sheet & Tube Co. in 1933 as a level roller in the Brier Hill sheet mill, was made finishing foreman in 1934, general foreman of the sheet mill in 1939, and general foreman of the conditioning yard and sheet mill in 1942.

ARTHUR C. WILBY, vice-president, U. S. Steel Corp. of Delaware.

• **Arthur C. Wilby** has been elected vice-president of U. S. Steel Corp. of Delaware. Mr. Wilby, who has been associated with U. S. Steel since January 1909, will maintain his headquarters in Chicago. He came to the company as a salesman for the subsidiary, Universal Atlas Cement Co., where he progressed through various positions until he became assistant to the president in 1917. He was appointed Chicago district manager of public relations, Carnegie-Illinois Steel Corp. in 1937. At the same time and until 1939, he also was in charge of the liquidation of surplus properties belonging to U. S. Steel subsidiaries. Since 1938 he has been in charge of public relations for U. S. Steel subsidiaries in the Chicago district.

• **Max Riebenback, III,** has been elected vice-president in charge of sales of Industrial Brownhoist Corp., Bay City, Mich., succeeding **James B. Hayden,** retired. Other changes in the sales organization include **H. D. Wright,** director of sales, eastern seaboard; **C. H. White,** director of sales, south and western portions of the United States, with headquarters in Chicago; **James A. Peppard,** district sales manager of the central region, with headquarters in Cleveland; **A. P. Lyvers,** district sales manager of the Chicago office; and **Stanley See,** district sales manager of the Philadelphia office.

• **John P. Jones** has been appointed assistant to Robert D. Becker, manager of the Housewares Div. of the Reynolds Metals Co. Until recently, Mr. Jones has been in charge of housewares sales in the Philadelphia area. This territory will be taken over by **John Schwartzel.** Mr. Jones will be in charge of the Housewares Div. and will handle sales and merchandising problems. His headquarters will be in Louisville.

• **Harold C. Weingartner** has been appointed chief engineer of the Vacuum Engineering Div. of the National Research Corp. of Boston. Until recently he was engaged in research work at the University of Illinois. Before that he was employed for a short time by the Standard Oil Co. of Indiana in research and pilot plant work.

• **Irwin McNiece** has been appointed assistant district superintendent of service and erection for the Los Angeles district of the Allis-Chalmers Mfg. Co. Mr. McNiece joined Allis-Chalmers in 1913, coming from the Telluride Power Co. For the last 3½ yr he has been working on Allis-Chalmers marine programs in Seattle, Tacoma and Portland shipyards.

• **Maurice D. Bennett** has been appointed superintendent of research for the Stamford, Conn. division of the Yale & Towne Mfg. Co., succeeding the late **Charles C. Ledin. Fred K. Heyer** will have charge of general research on locks and hardware in the research dept.

RALPH R. NEWQUIST, vice-president in charge of sales, Roots-Connersville Blower Corp.

• **Ralph R. Newquist** has been elected vice-president in charge of sales of Roots-Connersville Blower Corp., Connersville, Ind., one of the Dresser Industries.

• **A. E. Horne** has been named advertising manager of the Dodge Passenger Car Div., Dodge Bros. Corp., Detroit. Mr. Horne has been with Dodge since 1934, returning to the company last fall after 3½ yr in the Army Air Corps.

• **Warren Stuckey** has been named chief engineer of the Moore Corp., Joliet, Ill. He spent 10 yr as chief testing engineer of the Florence Stove Co., Kankakee, Ill., including service as chief research engineer and during the war was chief inspector and metallurgist in the Florence armor plate program for Standard Steel Spring, Pressed Steel Car, Cadillac, Fisher Body and International Harvester.

• **Felix C. Rodgers** has been named general manager of the Fire Div. and **H. V. Williamson,** director of research of the Cardox Corp. For the last several years Mr. Rodgers has been a district manager for the Fire Div. with headquarters in Pittsburgh. As general manager he will make his headquarters at the home office in Chicago. Mr. Williamson was formerly chief engineer of the company's Research Div.

• **Capt. C. McA. Evans,** recently returned from active duty in the Navy, has been elected president of the Chicago Steel Foundry Co. He entered the employ of the company in 1924 and served in various capacities, becoming vice-president prior to his entry in the service.

• **Ralph Redmond** has been appointed treasurer of Redmond Co., Inc., Owosso, Mich., in addition to his regular duties as vice-president in charge of purchases.

• **Robert M. Bowman** has been appointed a member of the sales staff of the newly opened Chicago office of Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc.

• **K. P. Swanson** has been named representative of Progressive Welder Co., Detroit, in eastern Connecticut, eastern Massachusetts, Rhode Island, Maine, Vermont and New Hampshire.

• **David C. Crowley** has been appointed to represent Colonial Broach Co. and Colonial Bushings, Inc. of Detroit in Texas.

• **L. W. Boone,** for the past 6 yr connected with Peden Iron & Steel Co. of Houston, Tex., has resigned to become associated with the Watts Hardware & Supply Co. of San Antonio, Tex. He expects to take up his new duties about Sept. 15.

• **E. C. Hawkins** has been placed in charge of the Chicago branch office of the John S. Barnes Corp. of Rockford, Ill. For several years Mr. Hawkins has been manager of the company's eastern sales office at Newark, N. J.

• **Benjamin A. Kiekhofer** has been elected president of the Eclipse Moulded Products Co., Milwaukee, to succeed E. G. Engman, who resigned several months ago, and **John Braught** has been appointed superintendent of manufacturing.

• **D. E. Fricker** has returned to the Le Roi Co., Milwaukee, as assistant to the advertising manager and to carry on sales promotion work.

• **Harold S. White** has been named head of engine research of Ford Motor Co., Dearborn, Mich. He served for 10 yr in the engine testing laboratory at Studebaker before joining Olds as director of engine research.

• **Earl C. Flinn** has been appointed assistant district manager at Detroit for Goodyear Tire & Rubber Co. He started with the company 20 yr ago.

• **George O. Hendee** has been appointed sales engineer in the Philadelphia territory of Hannifin Mfg. Co., Chicago.

• **Simon Edinburg** has joined the Luria Steel & Trading Corp. in the Boston office.

• **William J. McClung** has been named general manager of Bethlehem Pacific Coast Steel Corp.'s steel plants and mill depots. Mr. McClung will be in charge of operations of Bethlehem Pacific's steel plants in Seattle, S. San Francisco and Los Angeles, and mill depots at Seattle, Portland, San Francisco and Los Angeles. His headquarters will be at the S. San Francisco plant. He comes to the Bethlehem Pacific organization after more than 15 yr of service at the Lackawanna, N. Y. plant of Bethlehem Steel Co., where he has been assistant to the general manager since March 1945.

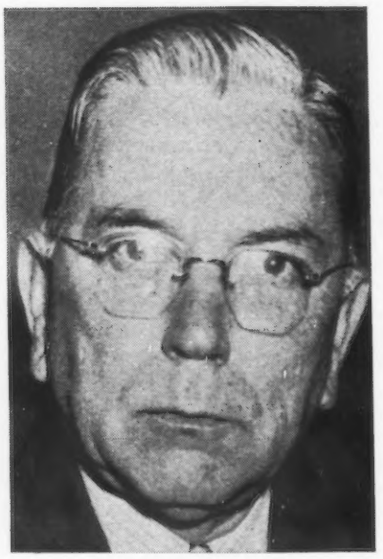
WILLIAM J. McCLUNG, general manager of steel plants and mill depots, Bethlehem Pacific Coast Steel Corp.

• **E. A. Foster** has been appointed manager of the application engineering dept. of the Railroad Div. of Fairbanks, Morse & Co. with headquarters in Chicago. He will have direct responsibilities for all locomotive application studies. Mr. Foster was formerly with the Electro-Motive Div. of General Motors Corp., where for the past 10 yr he was connected with various departments of that organization. **J. F. Weiffenbach** has been appointed chief engineer of the Railroad Div., also with headquarters in Chicago. He joins the Fairbanks-Morse organization from the Electro-Motive Div. of General Motors at LaGrange, Ill., where he was located for the past 10 yr, doing locomotive engineering and designing. **Frank Ross, Jr.,** who has been assistant in the Railroad Div. for the past year, has now been appointed sales engineer in charge of locomotive sales in the St. Louis area. **Frank M. Bosart** has been appointed Eastern manager of locomotive sales and will be located in the company's New York branch. Mr. Bosart comes to Fairbanks, Morse & Co. from the Electro-Motive Div. of General Motors, having had 10 yr service with that division in various capacities in both the service and sales depts. **Robert Aldag, Jr.** has been appointed sales engineer in the Chicago district with headquarters in the Chicago office. He started with the Erie Railroad and later joined the Chicago, Burlington & Quincy Railroad Co. where his duties these past 6 yr had to do with the operation and maintenance of Diesel locomotives.

• **Maj. Henry H. Thomas** has been appointed to the research and development staff of the Pemco Corp., Baltimore.

• **George B. Coffey** has been appointed manager of A. M. Byers Co.'s Chicago division. He succeeds **W. A. Taylor** who has resigned to enter private business. Mr. Coffey has been with A. M. Byers Co. since 1930.

• **Carl O. Ericke** has been appointed district manager of the Detroit territory of Carpenter Steel Co., Reading, Pa. Mr. Ericke has been connected with the company since July 1934 as sales engineer.



HARRY W. HOLT, vice-president and assistant general manager, Wilson Foundry & Machine Co.

• **Harry W. Holt** has been promoted to vice-president and assistant general manager of Wilson Foundry & Machine Co., Pontiac, Mich. Mr. Holt, who has served as vice-president in charge of sales since he joined Wilson in 1941, will continue the direction of the sales dept. and will also take on additional duties and responsibilities.

• **Charles H. Burch** has rejoined Curtis Lighting, Inc. after 5 yr of army life and is now Curtis sales representative in the Detroit territory. He joined Curtis Lighting, Inc. in 1936 as salesman in the Atlanta territory and was there until his enlistment in the Army.

• **Douglas C. Lynch** has been appointed assistant general manager of the Westinghouse Electric International Co. Associated with the company in New York and abroad since 1937, Mr. Lynch recently returned from a Westinghouse mission to the Near East, where he was in charge of an airport survey in Turkey and conducted other company business in Egypt. He is succeeded as manager of the special projects dept. by **Robert Russell,** formerly assistant manager of the department. Mr. Russell joined the Westinghouse Electric Corp. at its Mansfield, Ohio plant in 1933, and transferred to the International Co. at New York in 1935.

• **A. D. Collins** has been named traffic manager of Packard Motor Car Co., Detroit. He has been associated with Packard for 33 yr, starting as a factory clerk in 1913 and has served the company in production control, purchasing, sales distribution and business management. During World War II he was an executive assistant, assigned to the Aircraft Engine Div.

• **George E. Law** will head a new branch office of Reliance Electric & Engineering Co. in Appleton, Wis. Mr. Law has represented Reliance in Minneapolis since his return from the armed forces. **M. J. Sandling** will head another new office of Reliance Electric & Engineering Co. in Grand Rapids, Mich. Mr. Sandling, who has represented the company in western Michigan for several years, will be assisted by **W. F. Cliff,** electrical application engineer, who recently joined the Reliance organization. **William K. Schlotterbeck,** recently discharged from the armed forces, has rejoined the Philadelphia office of the company as sales engineer. **E. H. Koontz,** sales engineer for Reliance Electric & Engineering, who handled subcontracts in a naval ordnance program for Reliance in Minneapolis during the war, has been transferred to the company's New York office. Other engineers recently assigned to field sales offices are: **R. L. Custis** to New York; **D. M. Larson** to Minneapolis; **A. C. Perrin** to Chicago; and **Albert Mann** to Detroit.

• **Warren R. Purcell** has been named manager of quality control for the Lamp Div. of Sylvania Electric Products Inc., New York. He has been with Sylvania Electric since 1943 as a supervisor of quality control of new products and of incandescent lamp life testing.

OBITUARY...

• **William H. Ottemiller,** president of the Wm. H. Ottemiller Co., York, Pa., died July 27.

"A NORTHERN HI-LIFT HOIST up there Would Slash Handling Costs"

An efficient Northern Hi-Lift . . . low-headroom Electric hoist saves in many ways:

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When men lift and move material by hand, the power generated costs you at least $5 per kilowatt hour. Power for a Hi-Lift Electric Hoist costs you less than a nickel per kilowatt hour. Manpower lifting is slow, time wasting, costly. Hi-Lift Hoists do it quickly, economically.

2. time and overhead saving

Inefficient, slow material handling causes delay and countless minutes of lost time all through the shop while other operations wait on handling. Hi-Lift Hoist saves this time and money.

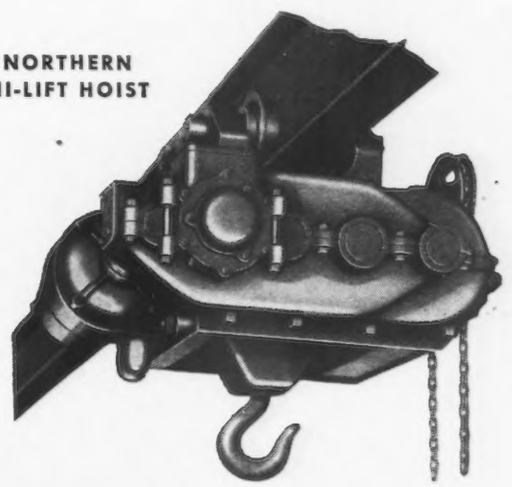
3. saving through safety

Men handling heavy material by hand are subject to serious and costly injuries. Power handling avoids these.

4. saving in floor space and overhead

Northern Hi-Lift Hoists use *no* floor space—carry the material above the floor. There is no vehicle wear on the floor—no danger to workers from rapidly moving vehicles. Aisles are used for work and walk space only—a substantial saving in space. The low-head-room feature of Hi-Lift Hoists makes better use of overhead space—permits handling of bulkier loads.

NORTHERN HI-LIFT HOIST



Northern Hi-Lift Electric Hoists are extremely sturdy, long lasting. Write for Bulletin H-3.

1542

NORTHERN ENGINEERING WORKS

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TYPES OF NORTHERN HI-LIFT HOISTS AVAILABLE

Floor controlled hoists • *Motor traveled hoists*
Cab controlled hoists • *Base mounted hoists*

Dear Editor:

BRAZILIAN STEEL

Sir:

Would like some information on Brazilian Steel Co. Are they doing any construction work? If so, how could we contact them in this country. Also how does one go about obtaining information on construction awards in South America? My husband is an electrician. Now that the war is over we would like to travel.

MRS. R. B. GRAVELLE
Gary, Ind.

● Considerable construction work is still under way at Volta Redonda. You can reach the Brazilian National Steel Co. at their U. S. offices at 570 Lexington Ave., New York. Further details on new construction projects in South America, in addition to those announced in THE IRON AGE, may be obtained from Engineering News Record, New York. The Record issues periodical lists of South American construction projects. —Ed.

WORLD STEEL PRICES

Sir:

We are engaged in the study of the evolution of steel prices in the world, but unfortunately we don't have information on steel prices in the United States during the years 1940-45 as we used to find them in your journal before the war . . . we would appreciate it if you could let us know what prices were during those 5 yr. . . .

SOCIETE DES ACIERIES DE LONGWY
Paris, France

● Data on steel prices for the war years, taken from the Annual Review issue, are being forwarded to you.—Ed.

THREE-WIRE GAGING

Sir:

Thank you for the additional copies of the article "Three-Wire Thread Gaging Simplified." We are having these mounted for reference in our machine shop where they will prove very useful.

D. F. TAYLOR & CO., LTD.
Birmingham, London

FISSION AT BIKINI

Sir:

Will you please send us three copies of the article "Fission at Bikini" from the July 18 issue. This is the only real description of the bomb test that I have found.

T. A. CAWTHIA
American Rolling Mill Co.
Zanesville, Ohio

CAST IRON WELDING

Sir:

On p. 68 of the June 20 issue you described a welding electrode for cast iron welding made by the International Nickel Co. Could you give us the address of this concern as we are very much interested in the rod described here.

Also, will you please send me a copy of the 10-page statement by C. C. Finn on the metric v. the English system. Although my opinion may be changed after reading this statement, it certainly seems to me that a change to the metric system should be started now, if ever. Fifty years from now, it would certainly be appreciated by that future generation.

R. L. FROHRING
R. L. Frohring Machine Co.
Chagrin Falls, Ohio

● The address of the International Nickel Co. is 67 Wall Street, New York. It was inadvertently omitted from the item. A copy of Mr. Finn's statement is being mailed.—Ed.

PEARL HARBOR INQUIRIES

Sir:

The article "A New Feeding Technique for Castings," which appeared in the Apr. 25 issue, is extremely interesting. Will you kindly advise where Thermotomic, mentioned in the article, can be purchased?

T. C. BUNCH
Master Molder
U. S. Naval Shipyard
Pearl Harbor, T. H.

Sir:

I would appreciate it if you could send me tear sheets of the article "Flame Cutting Stainless Steel" which appeared in the July 11 issue.

GEORGE H. BAILEY
Quarterman, Shipfitter
Naval Housing
Honolulu, T. H.

● The civilian personnel at Pearl Harbor is certainly keeping abreast of technological developments. The answer to your question, Reader Bunch, is that Thermotomic may be purchased from the Pittsburgh Metals Purifying Co., 1350 Marvista St., Pittsburgh. Tear sheets of the article describing a method of flame cutting stainless is being mailed to Quarterman Bailey.—Ed.

SUPPOSING

Sir:

Could you send me half a dozen copies of the editorial in your May 23 issue?

W. M. CONNOR
President and General Manager
J. H. Connor & Son, Ltd.
Ottawa, Canada

● We have mailed you copies of Mr. Van Deventer's editorial "Supposing."—Ed.

ELECTRICAL SHEETS

Sir:

We are writing to learn if you could furnish us with the names of manufacturers who may have available production capacity for transformer sheets and soft cold-rolled iron sheets and strip for deep drawing. . . .

E. A. LYONS
Purchase Dept.
Ericsson Telephone Sales Corp
New York

Sir:

We would like to know where we can get about 100 tons of electrical sheets. . . .

ALBERT FREEMAN
Tri-State Sales Co.
Portland, Me.

● If the ladies think they have trouble obtaining nylons, they should try purchasing electrical sheets. Deliveries from most mills are running up to 12 months on these sheets and we haven't heard of open capacity in these products since before the war. However, we are forwarding both correspondents a listing of all mills currently turning out electrical sheets. Good luck to them.—Ed.

BLAST FURNACE SLAG

Sir:

The National Slag Assn. has in process of preparation a book entitled "Blast Furnace Slag." The objective of this book is to give a systematic presentation under one cover of reliable and comprehensive information regarding iron blast furnace slag, its production, processing, properties and uses. This letter is to ask permission to reprint the model diagram showing spaces of composition of primary crystallization of a blast furnace slag which appeared in your publication in the issue of Oct. 30, 1924.

H. J. LOVE
Managing Director
National Slag Assn.
Washington

● Permission is gladly granted.—Ed.

COLOR DETERMINATION

Sir:

We are very much interested in your article "Color Determination of Tungsten, Titanium and Columbium," which appeared in the Apr. 4 issue. We should appreciate receiving two copies.

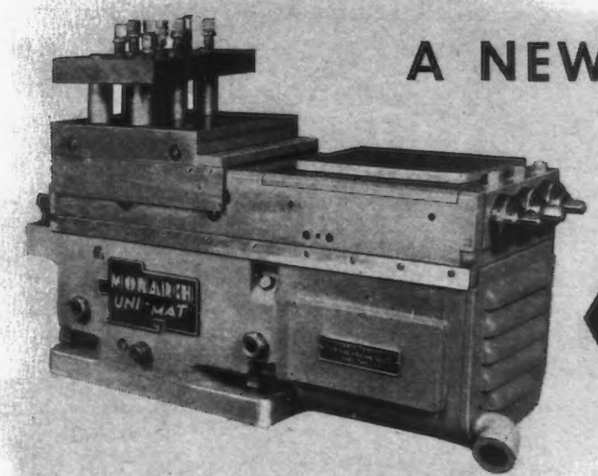
E. RANSOM
Fansteel Metallurgical Corp.
N. Chicago

IMPROVING ALUMINUM FINISHES

Sir:

Please send me two copies of the article "Soft Water Rinse Improves Aluminum Finishes" which appeared in the July 11 issue.

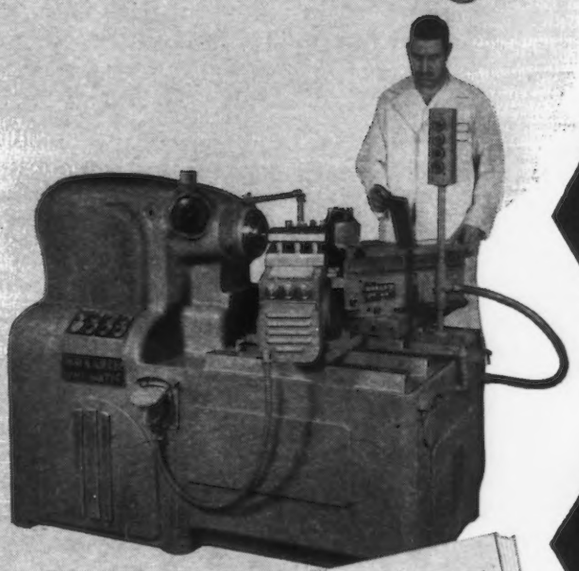
I. W. MARCOVITCH
RCA Victor Div.
Radio Corp. of America
Camden, N. J.



A NEW PRINCIPLE IN METAL TURNING—

THE UNI-MAT
(INDEPENDENT MOTOR-DRIVEN TOOL SLIDE)

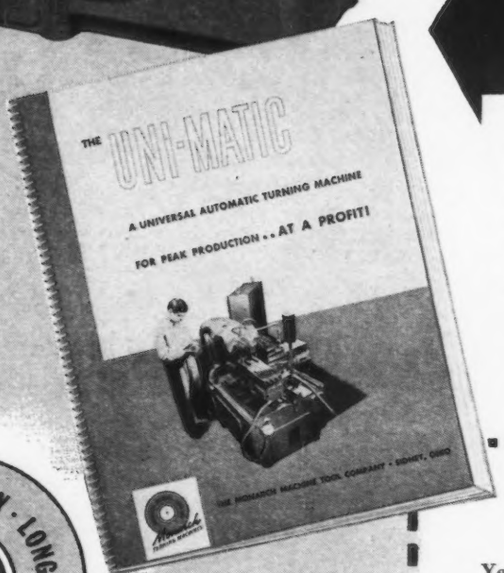
A NEW MACHINE—



THE UNI-MATIC
(A UNIVERSAL AUTOMATIC TURNING MACHINE)

...and A NEW BOOK

WRITE FOR YOUR COPY



For chucking and fixture work—as small as 1″ and as large as 16″ diameter—the Uni-Matic combines sustained high-speed production with universal adaptability. Completely independent motor-driven tool slides (Uni-Mats) and preselected spindle speeds *as high as 5000 RPM* are tied into an electronically controlled cycle.

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Sidney, Ohio

Yes! I'd like a copy of your new 36-page book on the Uni-Matic.

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Company_____

Street Address_____

City & Zone_____ State_____

This Industrial Week . . .

- **No Serious Drop in Steel Output Seen**
- **Scrap Price Problem Still Paramount**
- **Ingot Rate Falls Half Point to 91 Pct**

THE premature and at times over-pessimistic predictions made by some governmental officials and steel sources that the steel ingot rate would fall sharply because of a scrap shortage are not expected to be borne out in the near future at least. However with the scrap price situation completely up in the air and with some dealers piling scrap in their yards, the ingot rate could easily be affected to some extent if the OPA does not soon settle the scrap price controversy definitely one way or the other.

In the past few weeks the flow of scrap to the mills has improved somewhat but the movement is far below what it should be at this time of the year. On the other hand scrap shipments to dealers' yards throughout the country have shown an increase in the past few weeks and this trend is expected to continue until the scrap trade finds out whether an increase in the scrap price ceiling is a definite probability.

Some steel mills continue to draw from inventories which were accumulated during the time of the steel strike and also during the time operations were reduced because of the coal mine shutdown. It is apparent, however, that the supply of scrap in the hands of steel firms is at a low point compared with the current operating rates. Whether or not the release of scrap in the hands of dealers once the price controversy has been settled will reflect a back to normalcy trend in scrap inventories in the mills' hands remains to be seen.

The amount of scrap collected and processed by scrap dealers throughout the country is much higher than generally supposed. A lack of interest and a general lethargy on the part of dealers because they rightly or wrongly believe they are getting the small end of the deal, would over a period of time have substantial repercussions on the steel operating rate.

THE slight increase in the amount of scrap coming from manufacturing plants and railroads is looked upon as a forerunner of a much greater flow in the Fall as manufacturing concerns reach a higher rate of product activity. Also offsetting the precarious scrap supply situation is the substantial increase in the volume of hot metal being used in the openhearths.

While pig iron supplies continue extremely short as far as foundries and other users are concerned, the volume of iron for steelmaking is steadily climbing as the full effect of furnaces returned to operation is felt. The immediate future represents the first period since September 1945 that blast furnace output has not been threatened by coal or steel strikes. The only deterrent to this mildly optimistic outlook is the labor controversy on the Great Lakes which, although not yet of serious proportions as far as iron ore shipments are concerned, could easily develop into a definite threat to steel output this Winter.

The steel ingot rate this week has dropped ½ point to 91 pct of rated capacity but this small decline has no significance because it represents a normal fluctuation. There is every reason to believe that government pressure will be put upon mills, if necessary, to maintain as high a rate as possible during the next several months even though this means depletion of raw materials which will be needed in large quantities this Winter. The necessity for the government, through the CPA, to exert pressure for a high ingot rate is more or less unnecessary since steel firms are just as anxious to maintain output as is the government to see it.

ONLY by a high operating rate can the steel industry expect to combat high costs due to raw material and labor increases since the first of the year. Some mills, however, especially eastern Pennsylvania units have reduced operations by from one to four openhearths in order to conserve vanishing inventories of scrap and pig iron. These mills are not integrated to the extent that they have their own blast furnaces and ore mines and are entirely dependent upon the open market for their raw materials.

The steel price picture is coming into sharper focus following the meeting late last week between the steel industry advisory committee and the OPA. Not much progress was made at this meeting and considerable discussion revolved around the question of what constituted "a reasonable profit" and what year should be taken as a criterion. Nevertheless, indications are that a new steel price increase involving eight or nine products—those which steel companies claim have too low a return compared with the cost of production—may be granted.

The steel industry is also anxious that the OPA as soon as possible decontrol alloy steels, the supply of which it is claimed, does not warrent keeping them under OPA price supervision. It is expected, however, that the OPA will utilize the full 60 days allowed by law to cogitate over the validity of the steel industry's request.

Consumer demand for new products continues at an all-time high, and it is apparent that by the end of the year there will be large carryovers on some products which will interfere with the 1947 quotas in the first quarter. Directives on critical items and specific tonnages allocated for export are taking their toll from shipments originally slated for customers who so far have had no preferential treatment.

Many customers whose orders were accepted on a quota basis and whose deliveries were deferred because of CPA priorities are preparing their cases to present to CPA for preference assistance.

• **TINPLATE ALLOCATIONS**—CPA has refused to disclose fourth quarter tinplate allocations by country. Publication of third quarter allocations in THE IRON AGE is reported to have caused the agency a lot of trouble from various sources. It is understood that Russia is down for a tentative allocation but indications are that it will get no tinplate in the fourth quarter despite pressure from the Office of International Trade of the Dept. of Commerce.

• **BRITISH WORKERS' WAGES**—The weekly earnings of over 5,000,000 British workers in the last pay week in January 1946 were $18.51, which shows an increase of 74 pct since October 1938. These findings resulted from a British Ministry of Labor survey covering the average earnings and working hours of manual workers in manufacturing industries generally, and in some of the principal non-manufacturing industries. The average hours worked in the last pay week in January 1946 by all workers were 45.8, compared with 46.5 in October 1938.

• **RAILROAD CAR ORDERS**—The 3000 additional refrigerator cars ordered by Pacific Fruit Express were placed as follows: 500 to Pacific Car & Foundry; 500 to General American Transportation Corp.; 500 to American Car & Foundry; 500 to Pullman-Standard Car Mfg. Co.; 1000 to the Mt. Vernon Car Co. The Great Northern has ordered 250 refrigerator cars from Pacific Car & Foundry. The Atchison, Topeka & Santa Fe is inquiring for 500 to 1000 all steel 50-ton box cars. Detroit, Toledo & Shore Line is inquiring for 50 70-ton hopper cars. Illinois Central has ordered 400 50-ton hopper cars from the General American Transportation Corp. The cars are to be made of corten steel and will be of the design of the Railroad Research Bureau of the U. S. Steel Corp. The Board of Transportation of New York is contracting for 400 cars for the IND and BMT divisions of the subway system.

• **RUHR COAL EXPORTS**—It is reported that Four-Power agreement has been reached in Berlin fixing the price of coal exports from the Ruhr at $10 per ton f.o.b. basing point. Although the price of coal was determined by British experts in sterling, the British authorities ask payment from the countries getting coal from the Ruhr in dollars. This is due to the need for finding dollars to pay for food imports from the United States for the British zone of Germany.

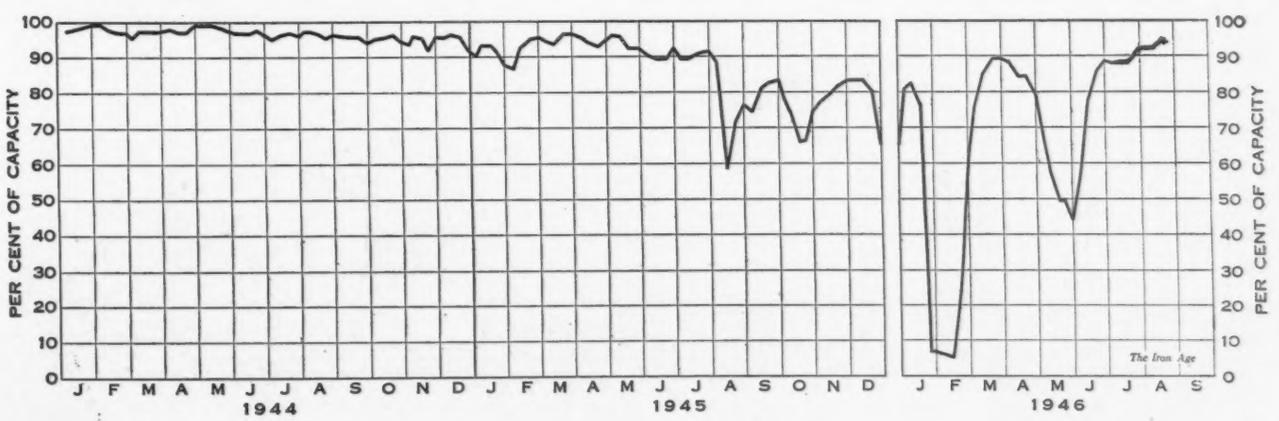
• **STEEL SUBSIDIES**—The RFC subsidy on sheet bars again closed the door at least for a while, on the technological wolf that is fast catching up with the hand sheet mills. Squeezed between the choice of paying higher prices for sheet bars, which they can't afford, or not getting sheet bars, the hand mills have a bleak future. Sheet demand now being so critical, RFC obtained approval of a government subsidy for the four main producers which gives them another breathing spell. However, return of competitive markets in sheets will ring the death knell for the hand sheet mill.

• **NAVY RESEARCH PROGRAM**—High on the list of research projects of the newly-created Office of Naval Research are studies looking toward the discovery of new heat resistant alloys. Operating under a $45 million budget during the current fiscal year, this new office will conduct research in all fields of basic science. The Navy now has in force 177 research contracts with 81 university, private and industrial research laboratories. Some work is also done by the Naval Research Laboratory, but 95 pct of the contracts are the direct result of ideas presented by outside sources. All contracts are of the no-profit negotiated type, and are characterized by the Navy as "cost-plus-nothing." Nuclear physics research accounts for 26 of the contracts. Ship propulsion by means of atomic energy is being studied, and success in this line is hoped for within 5 yr. The office hopes to obtain an increase of $15,000,000 in its appropriation for fiscal year 1948.

• **AUSTRIAN NATIONALIZATION**—Austria is reportedly completing plans for legislation that will nationalize 50 pct of industry, including 208 factories and other property returned recently by the U. S. in the American zone of occupation. The industries scheduled for nationalization include banks, oil, machines, mines, iron and steel, locomotive, electric works, and chemical. The law features, besides state ownership, the sale of shares totaling 49 pct of capital to the workers, but this phase is not yet completely settled, and will be applied in only a few cases at the outset as an experiment.

• **CAST IRON RADIATION**—Mechanization of two cast iron radiation plants, to be completed in August, will increase national production of cast iron radiation by about 30,000 sq ft a month, the CPA has announced. The monthly rate of cast iron radiation production in May, June and July for the nation exceeded 3 million sq ft, more than double the average monthly rate in the last half of 1945.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
August 13.....	100.0	93.0	88.0	87.0	95.0	102.0	94.0	99.0	101.0	70.5	100.0	60.0	89.5	91.5
August 20.....	99.0	93.0	88.0	87.0	98.0	102.0	95.0	95.0	101.0	71.0	93.0	75.5	89.5	91.0

CPA Says Mills Need Substantial Increase in Scrap Shipments

Washington

By KARL RANNELLS
Washington Bureau

• • • **Present high** production rates of iron and steel cannot be maintained unless the immediate future brings a substantial increase in the flow of scrap to the mills and foundries, CPA told THE IRON AGE this week. The agency is making new, vigorous efforts to step up its scrap drive in order to bring receipts up to a minimum of 2 million tons a month.

Meanwhile, this week OPA again entered the scrap picture by placing all sales of prepared scrap under maximum pricing regulations. Previously, maximum price ceilings applied only to consumers or their brokers and sales to dealers were exempt. This move, OPA hoped, would tend to prevent holding of quantities in inventory for possible future price increases—which OPA says it does not intend to grant.

"Industry must maintain its current rate of steel production over the next year at all costs," CPA officials said. "And in order to do it, more than 20 million tons of scrap will be needed. Two million tons a month would meet requirements and at the same time permit a gradual rebuilding of depleted and often non-existent inventories."

While the overall scrap situation has shown a measure of improvement, current receipts are running at least 40 pct behind requirements and the recovery is too spotty, the agency declared. Reports to CPA from 29 major users, representing more than 85 pct of consumption, showed that 60 pct of their requirements is being met by current receipts.

Of these 29 reporting consumers, 12 had less than a 14-day supply, 11 had from 14 to 30 days' inventory, while only six had more than a 30-day stockpile.

"Many plants are operating on a hand-to-mouth basis," said P. J. Treacy, chief of CPA's steel branch. "They are daily appealing to us for help in locating and obtaining scrap for their furnaces."

Mr. Treacy cited as an example one large producer whose normal inventory should run around 380,000 tons but is now down to about 130,000 and dropping. Typical of the Great Lakes situation, he said, is the report from one shipper who said his inventory was down 90 pct to less than 2500 tons.

One appeal for help, Mr. Treacy added, came from a group comprised of about 600 users who declared that "our foundry inventories have sunk to such dangerously low levels that they are threatening our operations."

Ed. Note: P. J. Treacy, chief of CPA's steel branch took issue with THE IRON AGE *statement (August 8, p. 100) that the scrap crisis appeared to have passed its peak. He asked the opportunity of stating CPA's views, which are presented in this article.*

The situation is all the more acute, CPA said, because of the shortage of critical pig iron. This has caused mixes in many instances to be reduced to 15 pct pig iron and 85 pct scrap as against the normal 50-50 mixture.

Another factor is the West Coast situation, it was added. This was relatively easy until a few weeks ago when it began to tighten. This area now urgently needs the scrap for which plans had tentatively been made for eastward diversion.

It has been suggested that CPA restrict steel mills to the purchase of other than foundry grades of scrap, thus ending a practice of some mills of buying all grades, mixed and separate, at premium prices. Such action, proponents hold, would assure many mills getting the heavy melting grades they need and reserving foundry grades for the foundries which cannot use the heavy mill grades.

In addition to efforts to get the shipbreaking program quickly under way, E. W. Greb, CPA salvage officer, said his Bureau of Industry Operations and the Dept of Agriculture have completed plans by which Agriculture will tell farmers of the desperate need for scrap in an effort to shake loose a large but unestimated quantity which is believed available from this source.

Also, other completed and projected inter-agency agreements are expected to yield appreciable amounts of scrap. War Assets has authorized both owning and disposal agencies to directly dispose of government-owned surplus unsaleable machinery as quickly as possible. Some $75 million worth of special machinery designed to make munitions and other war equipment, will be scrapped.

At the same time, an initial $3 million of WAA funds has been allocated to the Army Engineer Corps for the purpose of starting work on dismantling more than 5000 structures within 11 surplus Army and Navy installations. Usable materials will be made available to Veterans Administration for its hospital program and to priority holders for veterans housing. Metal items not suitable for re-use will be channeled to scrap buyers.

Scrap Over Scrap

Washington

• • • Two government agencies, CPA and WAA, are currently in a scrap about scrap with logical arguments for each side. Citing the scrap shortage, CPA wants WAA to release several thousand tons of scrap held as inventory in a surplus Iowa steel foundry; WAA has balked at the suggestion, holding that the scrap is a big selling point in attracting bidders.

Sets Ceiling on Prepared Scrap Sales to Dealers

Washington

• • • **In a move to** tighten controls on iron and steel scrap, OPA has ruled, effective Aug. 20, that maximum prices of prepared scrap, formerly applied only to sales to consumers or their brokers, are extended to all buyers and sellers. The action, taken under Amendment 7 to MPR 4, removes the exemption from price control of sales of prepared scrap to dealers. Sales of unprepared scrap are not affected.

In addition, OPA added another provision to prevent upgrading of

shipments of scrap, by requiring for the first time the physical segregation of the various grades in a mixed shipment to qualify for maximum prices provided for the various grades. The shipping notice requirement remains unchanged. The price agency says this amendment adds another safeguard and will tend to prevent upgrading of mixed shipments of scrap, which frequently results from rough approximations of the various grades contained in such a shipment.

The Iron and Steel Scrap Industry Advisory Committee has expressed its approval of both actions, according to OPA.

In the statement of considerations accompanying the amendment, OPA said:

"The supply of scrap is still not sufficient to satisfy demand. Heavy upward pressure is being exerted upon the scrap ceilings, and spirited competition for the insufficient supply continues. Dealers are constantly bidding more for prepared materials than they can realize under the price ceilings in subsequent sales to consumers. Since it is obvious that no dealer will continue to operate at a loss, one of two results must follow: either the material will be sold in violation of the terms of MPR 4, or it will be retained in inventory for a possible increase in the ceiling price. One alternative is as harmful to stabilization as the other. Wherever one dealer is willing to risk the results of an over-ceiling bid, no other dealer can hope to purchase the material at a price which will enable him to show a profit under the maximum prices established for sales to consumers.

"It is imperative that this price pressure be relieved by action which will prevent such situations from arising."

However, OPA recognizes the danger that the Aug. 20 amendment might result in some downgrading of scrap from prepared to unprepared grades, since dealer prices on unprepared scrap remain uncontrolled. The agency says all possible steps will be taken to avert such actions, including further amendment of MPR 4, should this become necessary.

Higher Steel Prices Appear Due; Industry Requesting Some Decontrols

By GENE HARDY
Washington Bureau

o o o

Washington

• • • **Higher carbon steel** prices and decontrol of alloy products and some minor carbon items seemed a good possibility after OPA's meeting with its general steel products advisory committee last week.

It is impossible to predict the amount of any future increase until OPA issues its procedural regulations which will spell out to industry just how application for higher prices should be made. These regulations are expected this week.

The industry is entitled to higher prices based on 1940 prices plus accrued costs on an industrywide product basis. Detailed data to support price petitions must be submitted to OPA.

Walter Watson, Youngstown Sheet & Tube Co., chairman of the industry committee has authorized the collection of necessary data as soon as OPA's requirements are known.

The procedural regulations are also expected to dispel the fear prevalent in some industry circles that collection of price and cost data by industry advisory committees or trade associations would open the door to anti-trust prosecution.

Unofficially the Dept. of Justice has indicated that there will be no objection to the collection of such material if the purpose is simply to present petitions to OPA for revision of prices. However, the Department will keep close watch to make sure that such data is not used by industry to fix prices. Justice will also follow price trends on products that have been decontrolled.

While OPA is allowed considerable discretion in the new law such as the sections which do not require the granting of anything more than a "reasonable profit" and specify that production must be increased before increases are approved, the agency is not expected to be entirely unbending in its steel pricing policy because of the drastic effects any drop in steel production would have on the economy.

The industry suggestion that alloy products and minor items, such as small brads, track spikes, etc., be decontrolled will be given full consideration according to OPA Chief Paul Porter and Warren Huff, metals price executive, who were in attendance. The industry will base its request for decontrol on the fact that the products which are in abundant supply are relatively insignificant in relation to total production. OPA will make its decision on the basis of the decontrol standards set up in the new law: (1) The product is not important to business or living costs and (2) supply is in balance with demands. Should OPA deny a decontrol petition the industry could appeal to the Price Decontrol Board whose word is final.

OPA has also agreed to continuation of the various subcommittees under the general steel products committee handling such products as sheet and strip. The primary job of these committees will be to work out possible increases in extras.

Meanwhile the industry expected OPA to increase delivered prices of iron and steel products at Toledo, Detroit, and eastern Michigan, Mahoning Valley and the Gulf and Pacific Coast basing points sometime this week.

The increases designed to reflect the July 1 increases in freight rates are as follows: For ingots, blooms, billets, slabs and sheet bars, 50¢ per gross ton, for all other iron and steel products 3.5¢ per hundred lb.

These increases would be added to delivered prices in the specified areas and will be applied to both carload and less than carload shipments.

OPA says this increase is necessary to avoid a drop in shipments of iron and steel products to many industries located in these territories. It will enable the freight rate increase to be passed on to consumers.

Canadian Steel Strike Continues With Little Hope for Early Compromise

Toronto

• • • **Developments in the Canadian** steel strike insofar as settlement proposals are concerned are of negligible quantity. Discussions from all factions continue but all parties appear to be sticking to their guns, and the companies refuse to increase their offerings above the 10¢ per hr mark for wage increases, while the unions decline to lower their demands. The strike which closed down the plants of Algoma Steel Corp., Sault Ste. Marie, Ont., and Dominion Steel & Coal Co., Sydney, N. S., and partially cut off operations at the Hamilton works of the Steel Co. of Canada, Ltd., is now in its fifth week, with disastrous effect on industrial operations throughout Canadian industry.

If the strike were settled today, Canada still would show a loss of at least 50 pct of normal production for third quarter and the loss is growing daily with the workers out. As a result of the production loss, it is doubtful that Canadian steel mills will be able to take on additional commitments with regard to new orders before the end of this year. Present backlogs on such lines as sheet, bars and plate, will more than absorb all production to the end of 1946 and some companies state that they will have large carryover of orders into 1947. Wire and nails are in serious short supply and it was announced this week that government officials have commandeered all nail supply in the hands of producers and warehouses in an effort to provide for the more urgent and essential needs. Construction jobs of all classifications have slowed down and many building programs that were planned for this year are being held over until 1947, while many of those started are being closed down pending improvement in steel supplies.

To provide steel for its plant in Montreal, the Steel Co. of Canada, Ltd., ran the picket blockade at its Hamilton works and got out a shipment of 3000 tons of steel by boat, and while it planned further shipments in this way, officials of the Canada Seamen's Union have advised members not to handle shipments from the Steel Co. of Canada. In the meantime, however, Stelco is stockpiling steel from its various mills and it is stated that fresh supplies of workers are leaving the picket lines and returning to their jobs daily. Approximately 3000 men are said to be working at the Hamilton plant against about 2000 at the start of the strike.

No Agreement Reached In J&L Foremen Case

Washington

• • • **The District of Columbia** U. S. Court of Appeals has declined to set aside an agreement between the government and unionized foremen in coal mines owned by Jones & Laughlin Steel Corp. of Pittsburgh.

J&L's appeal was filed July 17 (THE IRON AGE, July 25, p. 98) after a U. S. District Court on June 27 had denied a similar petition. Denial was made by the lower court on the premise that the steel firm could in no way question or interfere with actions of the coal administrator, holding that seizure gave the government all rights of a proprietor.

While the Aug. 16 decision upheld the lower court, the appeals court gave the whole issue of organization of supervisory employees a priority for a fall hearing.

Directly affected are only 136 J&L workers but the final decision will have an important bearing on union activities in the entire coal industry where supervisory employees have been held to be representatives of management.

Following certification of J&L foremen for collective bargaining the Coal Administrator entered into an agreement providing an increase of $1.85 for each full working day and an increase of $25 in vacation pay.

Cast Iron Soil Pipe Hiked

Washington

• • • **An increase of $1.75** per ton for cast iron soil pipe and fittings, effective Aug. 13, has been announced by OPA. This increase will be reflected in ceilings for resellers who are permitted to apply their OPA-approved mark-up to their new costs.

The new increase is estimated by OPA to offset the $2 increase in pig iron prices and $1.35 per ton rise in coke, representing about 70 and 30 pct of soil pipe production cost, respectively.

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400 PASSENGER PROPELLER: *The 19 ft diam Curtiss electric propeller for the Consolidated-Vultee B-36 provides for reversing, automatic synchronization and de-icing by passing heated air through the hollow steel blades. This Army bomber is the prototype of the 400-passenger Consolidated 37 airliner. Its size may be compared with that of the Republic P-47 Thunderbolt fighter propeller shown with it.*

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British Iron and Steel Exports Continue to Show Sharp Upward Trend

London

• • • **Britain's exports** of iron and steel during the second quarter of 1946 continued the sharp upward trend recorded since the end of the war, rising to 729,120 tons. This is the highest quarterly total for 9 yr, and exceeded the 1938 figure by one third, according to the *Board of Trade Journal.*

As in the two preceding quarters, exports to liberated countries in Europe accounted for about one-third of the total. Increases were general, except for railway material where exports fell by one-fifth as a result of smaller supplies to the Union of South Africa, Southern Rhodesia, India, and Brazil. Even so the total for the quarter was not far short of double the 1938 average.

Galvanized sheets were exported in appreciable quantities for the first time since the war, and there was a rise of one-third for tinplate, as well as for wrought tubes which included supplies for the oil industries in Iraq and Iran. Taking all finished products together, exports were the same as in 1938, whereas there was an increase of one-sixth for crude iron and steel, and shipments of rolling mill products were two and a half times the 1938 average.

The total quantity of machinery exported in the second quarter exceeded the 1938 average for the first time since the outbreak of war, and all the principal descriptions shared in the rise of 25,990 tons compared with the preceding quarter. Exports to Russia and the liberated European countries accounted for half the total increase. There was a further rise in exports of agricultural machinery, largely resulting from increased rehabilitation supplies of tractors to the Continent.

On account of special shipments to the U. S., France, and Russia, exports of tin rose sharply to five times the figure for the first quarter of 1946. There was a sharp reduction for second hand motor vehicles, mainly as a result of smaller rehabilitation supplies to Poland, while the number of pedal cycles exported reached the highest figure yet recorded.

Britain's imports of iron ore were the highest since the second quarter of 1940, being nearly 30 pct above 1938. Over half the increase of 15 pct on the previous quarter was due to larger shipments from Newfoundland and Spain. Imports of iron and steel scrap, mostly battlefield scrap from Germany, rose to about the 1938 figure. Pig iron and finished steel remained a mere fraction of the prewar figures, but there were increases for steel ingots and semi-finished steel which brought their aggregate above the 1938 average.

BRITISH EXPORT STATISTICS

	One Quarter of Year 1938 $ Million	Thousands of Net Tons			
		Quarterly Average 1938	4th Quarter 1945	1st Quarter 1946	2nd Quarter 1946
Iron and Steel					
Crude Iron and Steel	2.4	39.20	13.44	36.96	45.92
Uncoated Plates and Sheets	3.2	58.24	52.64	100.80	134.40
Other Rolling Mill Products	3.6	68.32	96.32	170.24	174.72
Galvanized Sheets	2.8	41.44	1.12	3.36	12.32
Tinplate	8.0	91.84	14.56	26.88	35.84
Pipes, Cast	1.2	25.76	14.56	17.92	23.52
Tubes, Wrought	5.2	61.60	39.20	69.44	81.76
Railway Material	2.0	44.80	41.44	106.40	82.88
Wire and Wire Products	2.8	23.52	10.08	25.76	35.84
Other Goods	10.4	81.76	35.84	71.68	101.92
Total Iron and Steel	41.6	536.48	319.20	629.44	729.12
Machinery					
Agricultural Machinery	1.2	5.15	10.52	12.99	13.77
Boilers and Boiler House Plant	4.0	15.68	7.06	10.97	13.44
Cranes, Hoists and Other Fitting Machinery	1.6	5.37	2.02	4.36	6.83
Electrical Machinery	8.0	12.54	18.59	10.75	11.76
Machine Tools (metalworking)	4.4	6.72	4.03	5.82	9.85
Prime Movers (non-electrical)	4.0	7.95	4.26	6.60	8.28
Textile Machinery	8.4	19.82	6.05	10.75	13.32
Other Machinery	26.4	55.32	28.78	44.68	55.66
Total Machinery	58.0	128.55	81.31	106.92	132.91

British Expert Estimates 1946 Tin Output at 103,200 Tons

New York

• • • **An independent** survey conducted by A. Strauss & Co., London metal merchants, supports much of the recent CPA report on Far Eastern tin prospects, though differing sharply in several respects, an executive of the British firm said here this week. Conceding that an accurate estimate of tin production was virtually impossible the Strauss spokesman pointed out that his firm has been dealing in tin for more than 40 yr and has numerous contacts throughout the tin producing world.

"We estimate that world production of tin during this year will amount to 103,000 tons," the company spokesman said. His figures are as follows:

Estimate of Tin Production, in Tons

	1946	1947
Bolivia	38,000	38,000
Belgian Congo	14,000	14,000
Nigeria	12,000	12,000
Malaya	15,000	41,000
Dutch East Indies	8,000	29,000
Siam	6,000	12,000
French Indo-China	1,000	1,000
Spain and Portugal	1,200	1,200
United Kingdom	1,400	1,400
Africa (other than Belgian Congo and Nigeria)	1,200	1,200
Argentina	500	500
Mexico	300	300
Canada	400	400
Burma	....	1,500
China	2,000	8,000
Australia	2,200	2,200
TOTAL	103,200	163,700

The estimate for 1946 is 20,000 tons above the annual production for the preceding 3 yr, the Strauss executive stated. "In arriving at the above estimate we have included 30,000 tons from countries which were under enemy occupation. The reason for this," the company spokesman continued, "is that production in Nigeria, the Belgian Congo and probably also in Bolivia will be lower than during the period 1942-45. It is now quite clear that the stocks of tin and tin ore left behind by the Japanese did not amount to very important tonnages.

"**The production** of 103,000 tons is, of course, very substantially below the world's requirements of tin, but in view of the gradual increase of the output in Malaya and the Dutch East Indies, the governments of the United Kingdom and the United States might, with safety, supplement the current production with releases of tin from their stocks. These are said to be in excess of 100,000 tons, consisting of approximately 60,000 tons in ingots and 40,000 tons tin in ore. Consequently it should be expected that the Allied Allocation Committee in Washington would from now on make more liberal allocations than heretofore. At any rate, the allocations to American consumers for the third quarter have been increased by 10 pct.

The estimate of Far Eastern tin output prepared for the Civilian Production Administration by John J. Croston appeared in THE IRON AGE, *Aug.* 1, *p.* 118.

"It is almost certain that the volume of production would increase more rapidly if producers who in some territories had to sell their output at an arbitrary price, could obtain a price compensating them more fully for the increase in costs. From a statement made a few weeks ago in the House of Commons, it appears that an adjustment, which would be favorable from the producers' point of view, is imminent. This would in all probability be accompanied by an increase in the British domestic price and possibly also by an upward revision of the existing export prices. Reference has been made recently to an increase in the American domestic price from 52¢ per lb to the cost level which, at the price now asked by Bolivia, would be 65.5¢ per lb, plus the cost of freight and insurance from South America.

"The rehabilitation in Malaya is considerably behind schedule and is below the estimate of the Tin Inspection Committee which went to Malaya some time after the liberation of that country. The said committee estimated that 29 dredges would be in operation by Aug. 1, 1946; a further 35 dredges by June 1, 1947; and 10 dredges by Jan. 1, 1948, while 7 dredges were specified as a total loss. It will probably take 3 yr before any new dredges will be in operation.

"It has been reported that some individual dredges have resumed production during the last few months, and according to a recent official statement, their number is now 11, or 18 less than originally estimated. Regarding the early prospects of the Netherlands East Indies production, there is unfortunately little definite information available, but there are grounds for assuming that good progress is being made."

French Aluminum Output Passes 1938 June Rate

Paris

• • • **French aluminum** production fell from 4137 tons in August 1945 to 2490 tons in February 1946 owing to lack of electric power during last winter, but it has gradually increased from March onwards and the June output totaled 6245 tons against a monthly average of 4147 tons in 1938. Plant capacity is sufficient to allow a further increase provided there is enough electric power, and development plans are under way.

Exports of aluminum started again at the beginning of this year, but the figures so far compare unfavorably with the prewar period. In February last 237 tons were exported compared with a monthly average of 1458 tons in 1938.

Production of bauxite ore has shown a regular increase during the past few months from 31,000 tons in October 1945 to 39,600 tons in March last. Exports since the beginning of the year are at about 44,000 tons against a monthly average of 27,500 tons in 1938.

CPA Explains Use Of HH and HHH Ratings To Nail Distributors

Washington

• • • **The use of HH and HHH** ratings for building nails provided for in amendments to Schedule A and Direction 11 to PR 33 was explained on Aug. 15 by CPA for the benefit of distributors who may not be operating under CPA's preference rating system.

The explanation follows:

(1) Under PR-1, various types of preference ratings are established—AAA, MM, HHH, CC and HH.

(2) HH and HHH ratings are used in connection with the Veterans' Emergency Housing Program. The HH rating is assigned under PR-33 to builders engaged in that program. The HH rating is also assigned under Directive 8 to PR-33 to manufacturers of prefabricated houses, sections and panels. Manufacturers of house-trailers may also be assigned HH ratings for nails under a new direction to PR-33 which is expected to be issued shortly. The HHH rating is assigned under Directive 11 to PR-33 when needed to expedite delivery of materials to builders engaged as contractors on the Federal Public Housing Authority's veterans' temporary re-use housing program. The HHH rating is the same as the HH rating except that HHH orders must be filled in preference to HH orders.

(3) Under Directive 13 to PR-1, most ratings for certain iron and steel products are either revoked, or suspended until Sept. 30. However, this does not apply to HH and HHH rated orders on distributors for nails and distributors must accept and fill such orders.

(4) Rules for accepting and filling rated orders are outlined in PR-1. Various published interpretations to PR-1 give detailed information on the sequence of deliveries for rated orders, types of purchasers from whom rated orders must be accepted, etc.

(5) A builder, or prefabricator, who is authorized to use HH and HHH ratings for nails may use these ratings on orders for nails he places with distributors, but not with producers. The same would apply to house-trailer manufacturers under the expected new direction to PR-33. This limitation is necessary to avoid upsetting established patterns of nail production and distribution. Practically all production of nails is channeled through distributors.

(6) Distributors who receive HH and HHH rated orders for nails from builders or prefabricators may not pass on (i.e., "extend") the ratings to their sources of supply. This would also apply to distributors receiving such orders from house-trailer manufacturers under the expected new directive to PR-33.

(7) Inventory and ordering restrictions on builders' use of HH ratings for various buildings materials, including nails, are explained in PR-33. Builders may order only the minimum quantities they need for approved projects. They must not specify delivery dates more than 30 days before the material is needed for incorporation in the project. They must not specify delivery dates later than during the third month from the time the orders are placed. Similar restrictions for prefabricators are contained in directive 8 to PR-33.

Auto Parts Price Increased

Washington

• • • **Effective Aug. 24** OPA has granted a manufacturers price increase for all automotive parts over their base date freeze prices. The increase is 15 pct except as follows:

Dump bodies and hoists, 24.5 pct; general purpose anti-friction bearings, 12 pct; fan belts, 17.3 pct; radiator hose, 26.8 pct; and engine and engine parts, 15.5 pct.

These increases are industry-wide. In addition, regional OPA offices are authorized to set ceilings for manufacturers whose annual sales volume is less than a half million.

Sees Automotive Goal Cut

Washington

• • • **Demands for** steel and cast iron by other industries such as construction and farm machinery as well as lack of lead was seen here by CPA as possible barriers to new postwar highs in automotive production during August, September and October.

Meanwhile CPA announced that July passenger car production totaled 220,321 units, topping June output by 78,000. Production forecasts are given as approximately 287,000 in August, 311,000 in September and 395,000 in October.

July truck output CPA said reached a total of 93,458, an increase of nearly 35,000 units over June and about 3000 less than the all-time record of 96,170 in April 1937.

Export Control Put On More Building Items

Washington

• • • **The Office** of International Trade, Dept. of Commerce, has announced that, at the request of NHA, 32 additional building materials and equipment have been placed under export control and will require individual licenses for shipment abroad.

Among items in the list are: Woven-wire screen cloth; heating system controls; circular saws; steel band, pit drag, and mill saws; crosscut and hand saws; augers and bits; shovels, spades, scoops, and drainage tools; ballast forks, stone forks, and trowels; guttering, metal roofing sheets, roofing steel; brass and bronze window strips; motors, 1/3 hp and under; temperature controllers, and parts; concrete block machines; bending machines; sawmill machinery; planers, matches, jointers and molders; veneer machinery; woodworking machinery; brickmaking machinery; wheelbarrows.

WAA Pig Iron Plan Rushed

Washington

• • • **WAA officials** are conferring with prospective operators in order to get 10 government-owned blast furnaces now inoperative into production to help remedy the pig iron and scrap shortage, it is reported by WAA Administrator Robert M. Littlejohn. More than 3 million net tons of pig iron could be produced annually by these furnaces it is stated.

Among the furnaces for which operators are sought are two at Indiana Harbor, Ind., one not complete, and one each at Daingerfield, Tex., Gadsen, Ala., Houston, Tex., Geneva, Utah, Ironton, Utah, Monessen, Pa. (incompleted), Chester, Pa., and the incomplete charcoal furnace at Rusk, Texas.

Weekly Gallup Polls . . .

Majority View Mounting Prices as Inevitable

Princeton, N. J.

• • • **Death and taxes,** said Benjamin Franklin, are the two things most certain in this world. The American people would for the time being add a third to the list—price rises.

A truly overwhelming majority polled from coast to coast are bracing themselves for a general price rise during the next 6 months, OPA or no OPA, according to George Gallup, director, American Institute of Public Opinion. More than nine out of every ten believe it's coming. Rarely in this country has such a large majority as that agreed on anything.

Mr. Truman and his White House staff may find it worth noting that more voters show a tendency to blame Congress or big business than Mr. Truman for the price rises they think are coming.

The average American is not, of course, an expert in economics and his opinion about the future cannot in any sense be taken as a forecast of what is going to happen to prices. But the views he expresses in the coast-to-coast institute poll serve as a guide to the mood or frame of mind with which he faces the future as a consumer. He's certainly resigned to the idea that things are going to cost him more, whether he likes it or not.

The poll put two questions before the voters of the country. The first:

"Do you think prices will go up in the next six months?"

	Pct
Yes	92
No	5
No opinion	3

The poll was conducted approximately one week after the OPA was temporarily suspended, and before prices became as high as they did in mid-July. Today the proportion expecting further price rises might be somewhat smaller than 92 pct.

Where the blame is likely to go can be seen from the replies to the second question in the poll.

"If prices do go up in the next six months, whose fault do you think this will be?"

	Pct
Congress	20
The people, everybody	17
Big business	12
Government officials	9
Laxness of OPA	7
Truman administration	7
Labor unions, strikers	5
Others	8
No one, rises are to be expected	7
Don't know	14

Some economists will note with interest that strikes and labor unions are ranked by the public comparatively low in the list. A number of those economists would put the blame more heavily there, claiming that the wage rises granted last spring to strikers in steel, petroleum, automobiles, coal, electrical equipment and other basic industries forced general price rises all along the line.

The table totals more than 100 pct because some people gave more than one answer.

Officials of the American Federation of Labor would narrow the blame down even further. According to AFL's monthly survey for August, the blame for living cost rises belongs to the CIO. The CIO touched the whole thing off, says the AFL, when the steel workers union forced the price ceiling break in February.

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• • • **The general public** is a lot more pessimistic about the outlook for world peace than prominent citizens recently canvassed across the country in a special poll of names included in Who's Who in America.

The poll among the citizens in Who's Who, an "informed group," so to speak, is nearly evenly divided on the issue of whether the United States will be involved in another war within the next 25 yr.

The general public, on the other hand, while more optimistic than in March, is of the belief by a substantial majority that this nation will be at war again before another quarter of a century has gone by.

In the poll of Who's Who names, the institute finds 39 pct who say they think we shall be at war again within 25 yr, 34 pct who say they do not think so, and 27 pct who offer no opinion.

Congress Leads Public's List Of Culprits Responsible For Price Rises; Few Name Labor

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Among the general public, the number who see war ahead within 25 yr is close to two out of every three included in a nationwide poll.

In conducting its special poll among citizens prominent in various fields—science, medicine, education, banking, industry, labor, law, clergy—the institute put the same question as was asked of all voters in a similar survey:

"Do you think the United States will find itself in another war within, say, the next 25 years?"

	Yes Pct	No Pct	No Opinion Pct
Who's Who vote...	39	34	27
All voters	65	16	19

Events at the Paris Peace Conference or at the meetings of the UN General Assembly next month will undoubtedly affect thinking about the chances for continued world peace among both prominent citizens and the general public as a whole.

The table below gives the trend of general public thinking on the question of future peace:

	All Voters Think war likely within 25 yrs. Pct	Think not Pct	No opinion Pct
Mar., 1945	38	45	17
Mar., 1946	69	19	12
TODAY	65	16	19

•

• • • **The British Labor Party** headed by quiet, plodding Clement Attlee is still the most popular in England, but the size of its following has dropped considerably since it defeated the Churchill government a little more than a year ago.

Three by-elections held during the last week of July have served to focus attention on the drop in Labor Party strength. Actually, however, a trend against Labor throughout the whole of England

(CONTINUED ON PAGE 128)

RFC Again Subsidizes the Price Of Sheet Bars for Non-Integrated Mills

Pittsburgh

●●●**The Reconstruction** Finance Corp., announced last week that subsidies have been reinstituted on sheet bars paying premiums of about $7 a ton to the two main producers, Sharon Steel Corp. and Jones & Laughlin Steel Corp. Some confusion attended the RFC announcement inasmuch as it appeared in one trade paper that the subsidy had been set up on merchant bars.

Under the new subsidy contract, Sharon Steel will produce 180,000 net tons by Feb. 15, 1947, and Jones & Laughlin will produce 25,000 net tons during the next 4 months. The original statement was also confused in this regard, having stated that J&L would meet their quota by the end of October and Sharon theirs by the end of the year.

Apollo Steel Co., Pittsburgh; Reeves Steel & Mfg. Co., Dover, Ohio; Mahoning Valley Steel Co., Niles, Ohio; and Superior Sheet Steel Co., Canton, Ohio, subsidiary of Continental Steel Corp., will receive these 205,000 tons of sheet bar paying the ceiling price of $38 a ton. Jones & Laughlin will be reimbursed by the government to the extent of $7.84 a ton plus certain freight differentials and Sharon will get an additional $7 a ton plus certain freight differentials. In effect, these subsidies make the price of sheet bar $45.84 for J & L, and $45 a ton for Sharon.

The four companies getting this subsidy aid were the concerns that a few months ago were negotiating the purchase of the Lowellville, Ohio, plant of Sharon Steel Corp., to obtain their own source of sheet bars. The capacity of Lowellville is just about equal to their combined needs. The negotiations were never concluded and Lowellville, which Sharon had originally intended to close down, is now operating and is expected to remain in operation.

The subsidy on sheet bars goes back several months to the time when Jones & Laughlin Steel Corp., refused to produce this item at the ceiling price. When the OPA expired on June 30, there were no provisions for the continuance of the subsidy contract with J&L, and the company again refused to handle new business and intended only to run out unshipped contracts. However, with the new RFC subsidy contract, both J&L and Sharon will remain in the sheet bar business at least for the present.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period JUNE - 1946

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production Net Tons	Current Month: Production Per cent of capacity	Current Month: Shipments (Net Tons) Total	Current Month: Shipments (Net Tons) To members of the industry for conversion into further finished products	To Date This Year: Production Net Tons	To Date This Year: Production Per cent of capacity	To Date This Year: Shipments (Net Tons) Total	To Date This Year: Shipments (Net Tons) To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	40	1	xxxx	xxxx	xxx	251,664	98,860	xxxx	xxx	1,482,341	685,925
Structural shapes (heavy)	12	2	9,421,550	296,643	40.7	274,071	xxxx	1,373,900	30.8	1,416,493	xxxx
Steel piling	4	3		18,605		10,950	xxxx	67,813		52,314	xxxx
Plates (sheared and universal)	27	4	17,080,770	317,960	22.6	303,941	20,024	1,732,530	20.4	1,736,861	117,208
Skelp	5	5	xxxx	xxxx	xxx	18,683	12,551	xxxx	xxx	152,033	71,908
Rails—Standard (over 60 lbs.)	4	6	3,657,000	139,752	46.4	122,416	xxxx	689,180	38.0	672,933	xxxx
—All other	5	7	392,000	12,542	38.9	10,720	xxxx	62,623	32.2	61,094	xxxx
Splice bars and tie plates	12	8	1,745,900	44,722	31.1	44,466	xxxx	261,070	30.1	279,473	xxxx
Track spikes	10	9	349,400	10,843	37.7	11,416	xxxx	60,600	35.0	65,371	xxxx
Hot Rolled Bars—Carbon	33	10	xxxx	548,861	xxx	422,696	50,849	2,866,526	xxx	2,363,298	292,350
—Reinforcing—New billet	15	11	xxxx	82,188	xxx	95,906	xxxx	402,712	xxx	438,751	xxxx
—Rerolled	12	12	xxxx	10,672	xxx	11,210	xxxx	60,841	xxx	62,247	xxxx
—Alloy	22	13	xxxx	143,374	xxx	114,337	9,318	695,079	xxx	578,982	57,109
—Total	39	14	22,009,660	785,095	43.4	644,149	60,167	4,025,158	36.9	3,443,258	349,459
Cold Finished Bars—Carbon	24	15	xxxx	94,718	xxx	97,463	xxxx	563,271	xxx	566,028	xxxx
—Alloy	23	16	xxxx	21,592	xxx	18,753	xxxx	99,908	xxx	87,899	xxxx
—Total	31	17	2,851,510	116,310	49.6	116,216	xxxx	663,179	46.9	653,927	xxxx
Tool steel bars	18	18	255,010	9,308	44.4	9,868	xxxx	51,590	40.8	51,343	xxxx
Pipe & Tubes—Butt weld	14	19	2,176,520	96,022	53.6	94,289	xxxx	586,094	54.3	576,310	xxxx
—Lap weld	9	20	730,200	19,272	32.1	19,334	xxxx	112,564	31.1	127,692	xxxx
—Electric weld	10	21	1,536,900	63,634	50.3	54,022	xxxx	324,440	42.5	269,954	xxxx
—Seamless	13	22	3,169,600	144,486	55.4	129,073	xxxx	912,231	58.0	812,191	xxxx
—Conduit (cap. & prod. incl. above)	6	23	xxxx	xxxx	xxx	6,160	xxxx	xxxx	xxx	38,105	xxxx
—Mech. tubing (cap. & prod. incl. above)	11	24	xxxx	xxxx	xxx	31,581	xxxx	xxxx	xxx	193,424	xxxx
Wire rods	25	25	7,293,670	380,497	63.4	88,605	29,951	1,917,938	53.0	456,724	163,593
Wire—Drawn	39	26	5,702,890	294,240	62.7	166,091	12,939	1,509,139	53.3	875,658	63,185
—Nails and staples	18	27	1,260,360	48,342	46.6	50,654	xxxx	254,628	40.7	257,147	xxxx
—Barbed and twisted	15	28	543,610	17,688	39.5	18,208	xxxx	98,398	36.5	97,385	xxxx
—Woven wire fence	15	29	1,121,860	28,421	30.8	28,753	xxxx	175,044	31.4	175,472	xxxx
—Bale ties	12	30	149,700	8,354	67.8	8,978	xxxx	* 37,416	50.4	40,293	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	56,181	30	xxxx	xxx	353,833	819
—Chemically treated	8	32	465,000	9,909	25.9	8,770	xxxx	* 66,025	28.6	62,993	xxxx
Tin and Terne Plate—Hot dipped	9	33	3,758,850	165,189	53.4	172,765	xxxx	810,421	43.5	863,299	xxxx
—Electrolytic	9	34	2,231,850	70,480	38.4	74,208	xxxx	389,511	35.2	404,823	xxxx
Sheets—Hot rolled	30	35	19,353,320	1,095,467	68.8	469,178	25,265	5,900,201	61.4	2,595,343	* 162,926
—Cold rolled	13	36	7,127,460	437,409	74.6	315,959	xxxx	2,343,386	66.3	1,703,334	xxxx
—Galvanized	16	37	2,924,130	120,448	50.1	117,187	xxxx	647,621	44.6	650,232	xxxx
Strip—Hot rolled	25	38	7,180,030	187,759	31.8	107,581	19,332	1,018,399	28.6	644,245	* 101,909
—Cold rolled	34	39	5,067,450	105,554	41.8	107,986	xxxx	594,257	39.0	588,580	xxxx
Wheels (car, rolled steel)	5	40	315,400	15,977	61.6	14,209	xxxx	103,957	66.4	108,363	xxxx
Axles	6	41	398,170	10,894	33.3	7,751	xxxx	54,113	27.4	52,641	xxxx
All other	3	42	169,510	3,234	23.2	545	xxxx	21,010	25.0	2,506	xxxx
TOTAL STEEL PRODUCTS	140	43	xxxx	xxxx	xxx	3,966,628	279,119	xxxx	xxx	22,017,988	1,716,930
Effective steel finishing capacity	140	44	64,059,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	140	45	xxxx	xxxx	xxx	70.0%	xxxx	xxxx	xxx	63.9%	xxxx

* Adjusted.

During 1945 the companies included above represented 98.4% of the total output of finished rolled steel products as reported to American Iron and Steel Institute.

Hudson Bay Mining And Smelting Co. Operations at Flin Flon

• • • Canada mines copper, zinc, cadmium, gold, silver and selenium at Flin Flon, Manitoba in central Canada. As Canadian base metals are often located in deposits containing precious metals, it is not generally necessary for them to carry all costs of recovery. Canada's most productive sources of copper and nickel come from Ontario, east of Manitoba, the workings of the International Nickel Co. of Canada, Ltd.

ABOVE

• Pouring blister copper in the smelter of the Hudson Bay Mining & Smelting Co. Ltd. at Flin Flon, Manitoba. Estimated copper reserves at Flin Flon are 27.4 million tons of ore averaging 2.59 pct copper and 2.20 pct zinc.

o o o

LEFT

• Electrolytic zinc refinery of the Hudson Bay Mining & Smelting Co. Ltd. at Flin Flon which is the producer of 30 pct of Canada's zinc.

• RIGHT: Mucking operations at the 3500-ft level at Flin Flon, Canada.

• LEFT: Sampling ores containing copper, zinc, cadmium, gold, silver and selenium at Flin Flon, Canada.

Most Machine Tool Builders Hold Prices Despite Decontrol

New York

• • • **As yet, machine** tool builders have not signified their intention of taking advantage of the opportunity of raising prices on their products offered by the OPA decontrol order for industrial machinery and equipment effective July 26 by Amendment 33 to Supplementary Order 129.

One manufacturer of punch presses has taken the lead in the industry by increasing its prices between 25 and 30 pct on sizes that have been suffering losses. Under these circumstances many sizes were cut out of the production line and producers wouldn't quote on inquiries. This was particularly true of many types of specialized machines on which, under prewar conditions, the profit was small or nonexistent. When prices were frozen at prewar levels, builders simply stopped making such equipment. A manufacturer of keyseaters hasn't quoted since the war and railroads who need them for keyways on driving wheels have been particularly inconvenienced. One manufacturer of press brakes has not been building them for some time and since they have not been buying steel regularly for this purpose it has been found difficult to obtain steel for side plates at this time.

Builders find that aside from the delays in production due to the difficulties in obtaining metals and components, there is also what appears to be a slowdown in labor. Comparisons of production and assembly times on identical machines with prewar standards has revealed to some builders a significant drop in the productivity of labor even for experienced men. Deliveries of machine tools are therefore delayed for an unreasonable period beyond their promised date of shipment.

Dealers here report that deliveries of tools have dropped during July and August well below the normal seasonal fluctuation. They attribute the delay to a combination of circumstances, including the week or 2 - week shutdown of builders for vacation, the cumulative effect of materials shortages and the labor slowdown.

Meanwhile inquiries and orders for tools have declined considerably and dealers' time is largely occupied with quotations on tools for use in contract work which for the most part do not result in orders. Dealers find much of their time occupied by answering requests for information from WAA agents who are reported generally not to have a broad knowledge of the industry or its products. It is pointed out that there are 472 agency contracts outstanding in the New York regional area of WAA and dealers estimate that there are not over 30 new and used machinery dealers in the area who know the field. There is a total of 2537 approved WAA agency contracts in the country, but it is doubted that there are more than 1500 experienced dealers.

Dealers report that some types of machine tools continue to be scarce or non-existent. These include engine lathes, shapers and knee type horizontal milling machines. In most instances war contractors who had such tools deemed it advisable to buy them from the government.

•

Cleveland

• • • **A ghost of** price control, like the skeleton in the family closet, is causing a good deal of confusion in the machine tool industry. Recent OPA action, while fraying the price regulations which bound the industry hand and foot during the war to a fine, elastic thread, has brought forth from the industry a variety of doubts as to what items and services are under price control.

In regard to machining services, when a customer sends a piece of work into a plant to have operations performed on it, this is called machining or jobbing service, and is controlled by Maximum Price Regulation 581. According to the NMTBA bulletin, the distinctive conditions in this case are that the parts to be worked on belong to the customer and are new parts, not used parts. On such jobbing or machining services, including abrading, assembling, cutting, forming, grinding, machining, shaping, and welding, the prices are still to be those charged on March 31, 1942.

Control is suspended over charges for annealing, Anodizing, bonding, lead coating, painting, case hardening, etc. Plating on non-metallic material is no longer under price control.

Rebuilding, repairing and maintenance services on used machine tools, accessories, attachments or parts are decontrolled, providing the items to be repaired belong to the customer.

In the case of small machines, if a machine tool builder buys a used machine and takes it into his plant to rebuild and resell, the price of the rebuilt machine is under Maximum Price Regulation 1, only if it weighs 2000 lb or less, and is

JET HELICOPTER: *Until now on Britain's secret list, this jet driven helicopter was shown recently. The unit has jet torque reaction, with directional control provided by means of laterally directed jets at the tail.*

not in the list of automatic machines.

Erection, inspection, demonstration, and repairing done by an employee of the machine tool builder on a used machine tool in the customer's plant is not under price control.

Prices of used and rebuilt machine tools have been under Maximum Price Regulation 1. From now on, used machine tools which weigh in excess of 2000 lb are no longer under price control. All rentals of machine tools, whether new or used, are no longer under price control.

MPR 67 requires a report on the price of a special machine, or a machine of new design comparable to an earlier machine, or an entirely new machine. However, such reports are no longer required on machine tools weighing in excess of 2000 lb, or which are included in the list of automatic machinery.

All items suspended from price control in the domestic market are automatically suspended from price control in the export market.

Aside from the confusion, decontrol of most machine tool prices, and the 20 pct price increase granted the industry April 19, have had no great effect on the industry's prices or its profits. The industry is still above 1939 levels, but with the manufacturing capacity added during the war its profits will not be as great.

According to a machine tool price study made by the U. S. Dept. of Labor, prices of standard machine tools rose approximately 10 pct during the second quarter of 1946, ending a period of over four and one-half years of almost complete stability. However, prices of machine tools in June, 1946, were 30 pct higher on the average, than in August, 1939.

Prices for most of the major types of machine tools rose during the second quarter following OPA's announcement on April 19, that machine tool builders were authorized to increase their selling prices 20 pct to offset recent increases in material and labor costs, the report states.

The Dept. of Labor study shows that the composite index of machine tool prices rose in each month of the quarter with the bulk of the advance concentrated in May. Except in the case of punch presses, builders did not take advantage of the full 20 pct increases allowed by OPA.

The price rise on other types of tools ranged from about 1.5 pct for radial drills, to 16 pct for turret lathes. Quotations for horizontal shapers remained unchanged. Grinding machines and engine lathes rose in price more than the average of 10 pct for all types.

Punch presses as a group rose 27 pct in price during April to June, due primarily to an advance of approximately 35 pct in prices of 600-ton capacity presses. OPA controls on prices of presses of this size were suspended.

According to the study, since August, 1939, the greatest increases have occurred in prices of presses, 58 pct, and in prices of grinding machines and engine lathes, over 30 pct. Prices of boring mills, radial drills, turret lathes, milling machines, shapers and planers have advanced from 25 to 29 pct. The smallest price rises have occurred for screw machines, 22 pct, and upright drills, 18 pct.

Some observers are certain the present price structure means the end of the $30 million monthly-shipment yardstick, which in the past has been synonymous with at least partial prosperity for the machine tool industry. By the same token, a backlog of $180 million will no longer mean 6 months' work. Allowing for price increases, the trend in new firm orders, at the present time is slightly downward, although the price increases do not yet show up in shipments.

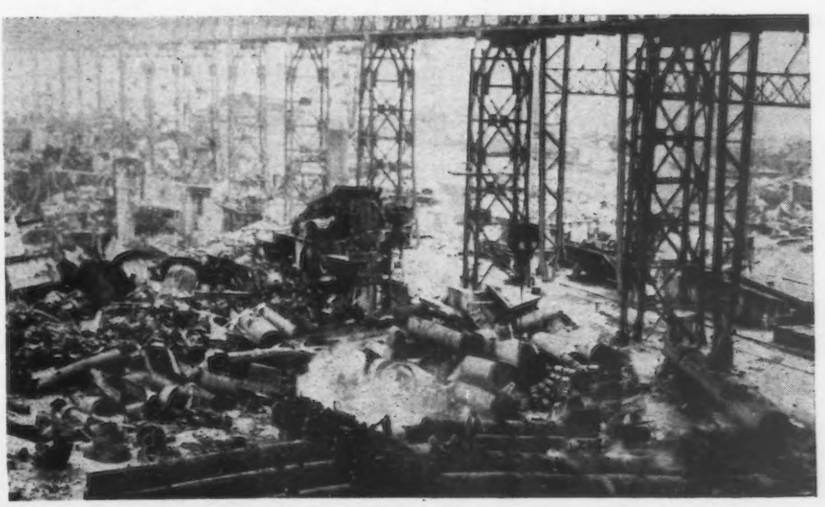
In reply to numerous inquiries the following list is published covering machine tools subject to MPR 1 and MPR 67, which were removed from price control by amendment 33 to Supplementary Order 129, effective July 26. The list includes, but is not restricted to the following machines weighing over 2000 lb with standard equipment:

Automatics (bar and chucking), bending rolls, boring mills (horizontal and vertical), brakes, broaching machines, bulldozers, cam milling machines, centering machines, chambering machines, chamfering machines, cut-off machines, diamond boring machines, drills (multiple spindle, radial, sensitive), filing machines, forging hammers, gear cutting and generating machines, grinders (cutter, cylindrical, disk, internal, surface, tool), hammers (power), headers, hobbing machines, honing machines, jig boring machines, keyseating machines, lapping machines, lathes (engine, turret and special purpose), milling machines (hand, plain, universal, vertical), nibbling machines, oil grooving machines, planers, polishing and buffing machines, presses (power), profilers, punching machines, screw machines, shapers, sharpening and filing machinery, slotters, swaging machines, tapping machines and threading and thread milling machines.

Only the following *automatic* machines regardless of weight: (An automatic machine is defined as one which, with standard equipment, is capable of acting fully automatically so that once started manually it goes through its complete cycle of operation repeatedly and continually until stopped.)

Screw machines (single and multiple spindle), threading machines (single and multiple spindle), milling machines, chucking machines (vertical and horizontal), cut-off machines, screw slotting machines, tappers, bolt and screw head trimmers, nut forming machines and turret forming machines.

JAP SCRAP: *The once illustrious Japanese naval base at Kure is turned into a junk yard in the process of reducing the Jap war potential to zero. The midget submarines in the foreground will be cut up for scrap.*



Foundry Group Meets With CPA to Alleviate Shortage of Pig Iron

Detroit

• • • **Members of the** Gray Iron Foundry Industry Advisory Committee met with Civilian Production Administration representatives in Washington on Aug. 20 to discuss ways and means of alleviating the critical pig iron shortage which threatens severe curtailment of production by the entire metalworking industry.

Acting as spokesman for the Gray Iron Founder's Society, Edward C. Hoenicke, general manager of Eaton Mfg. Foundry Div., Detroit, said:

"The almost complete drying up of scrap supplies and the earmarking of pig iron for favored industries have resulted in severe curtailment of foundry output which in turn is being felt by practically every user of gray iron castings." In requesting a meeting of the Gray Iron Foundry Industry Advisory Committee with CPA, Mr. Hoenicke expressed the hope that a solution can be worked out whereby all available scrap sources can be tapped and a more equitable distribution of pig supply can be arranged.

In Detroit, the pig iron situation has grown steadily worse since the steel strike. With pig iron sources closed down because they found it unprofitable to operate, and steel mills and foundries substituting pig iron where they would ordinarily use scrap, the pig iron supply situation has become increasingly critical during the past few months. The diversion of pig iron to certain favored industries under the terms of Directive 13 to M-21 has had the further effects of increasing the difficulties of obtaining adequate pig iron supply for automobile foundries, according to Mr. Hoenicke.

One prominent producer in this section reports that pig iron deliveries during the past several months have been only 50 to 60 pct of foundry requirements. Almost without exception foundries in this area are operating with only a few days' supply and the prospect is that conditions will grow worse unless some action is taken which is favorable to the hard pressed automotive foundries.

At the same time, scrap supply to automotive foundries is even more difficult to obtain. No. 1 cast scrap has practically disappeared from the market. A foundry which has placed a standing order for 500 tons of scrap per month has received no scrap at all during the past few months.

Prominent automobile producers in the Detroit area have reached as far as Utah and Mexico in order to obtain pig iron necessary to keep their foundries operating.

Sets Up Accelerated Surplus Program To Help Scrap Shortage

Washington

• • • **To be available** for reconversion within the next 30 days, WAA has put into effect an accelerated sales program involving upwards of $75 million of government owned surplus materials designed to help relieve the shortage of metals and metallic scrap. Offerings to priority claimants will be made concurrently.

The program calls for the immediate listing and advertising in WAA's 33 regional offices of all government-owned surplus metals and metal products which include such items as alloy steel billets and bars, pipe and tubing, aluminum sheets, rods and tubing, industrial valves and fittings.

The fixed price method will prevail in the sale of this surplus property, except for the following which will be sold on a sealed bid basis: Aluminum scrap, including castings, forgings and rivets; tool steel, other than standard items definitely identified by trade name; battery plates, subject to Dir. 15 to CPA-PR 13; property in N-3 or N-4 condition, which is not priced; property consisting of non-standard commercial items or of items that are of unknown marketability; and small lots made up of various items.

Copper, copper wire and copper base alloy scrap will continue to be allocated on the basis of CPA directives.

Among major WAA regional offices offering this material for immediate sale are New York, Philadelphia, Chicago, Boston, Detroit and Cleveland.

CPA Reduces Purchase Authorizations to Aid Merchant Pig Supply

Washington

• • • **In an attempt** to remedy dislocation of the supply of merchant pig iron, CPA has directed a 25 pct reduction in August purchase authorizations for the southern area and a 10 pct cutback (except for cast iron soil pipe) in the Buffalo, Pittsburgh and eastern Pennsylvania areas.

Four blast furnaces are affected in the northern areas—Alan Wood Steel Co., Conshohocken; Tonawanda Iron Corp., North Tonawanda; Pittsburgh Coke & Chemical Co., and Bethlehem Steel Corp. The order applies to three blast furnaces in the south—Republic Steel Corp., Thomas, Ala.; Woodward Iron Co., Woodward, Ala.; and Sloss-Sheffield Steel & Iron Co., Birmingham.

Reductions were ordered after a review of final August authorizations by CPA under Dir. 13, M-21, which gives special assistance during August-September in procuring pig iron and gray and malleable iron castings for housing and farm machinery items and railroad brake shoes.

It was determined on review that virtually all the output of the southern furnaces and a third of the production of the specified northern furnaces was being taken by the allocations.

It was pointed out by CPA that the reductions do not affect orders under Dir. 13 for iron castings.

WAA to Speed Disposal

Washington

• • • **Drastic changes** to speed the disposal of surplus electronics, including the establishment of a special priorities office to process applications from veterans has been ordered by Robert M. Littlejohn, War Assets Administrator. Immediate revision in the program calls for: (1) Complete reorganization of the electronics division which sells surplus radio and radar equipment; (2) adoption of shortcuts in the handling of inventories; (3) readjustment of sales agents' agreements; and (4) revocation of agreements not compatible with the public interest.

The London ECONOMIST

Power Politics in Paris

Reprinted by special permission to further understanding on how political and economic affairs are viewed in London.

° ° °

THE Paris Conference is only in its second week; but already from the first week, almost from its first ceremonial session, it has been gripped by a queer and, at first sight, baffling psychosis —the psychosis of an uninterrupted and unmitigated rivalry between the Western Powers and Russia. At first, in plenary session, when nations delivered their solemn and somewhat hackneyed orations, the rivalry was not very marked. But in the Commission of Rules of Procedure it has been apparent from the beginning. Gradually this mood, emanating from the Commission— from the *Salle des Pas Perdus*, where it holds its sittings — has spread all over the Luxembourg Palace, permeating the Hall of Plenary Sessions, the lobbies, and the pressrooms.

It would be a futile and monotonous job to try to sum up here the debates on rules of procedure. Even to observers with a strong liking for hair-splitting and procedural squabbles, most of these must have appeared completely irrelevant. Two points of procedure which have deserved attention for their own sake have been the chairmanship of the Conference and the rules of voting. On both these points the Council of Foreign Ministers had reached what seemed a fairly clear agreement. It had been decided that the Big Four should preside in rotation and that the Conference should pass its recommendations by a two thirds majority on all but matters of procedure.

The agreed procedure had hardly been laid before the Commission when it was subjected to a heavy barrage of criticism by representatives of smaller nations. They asked that the rule that one of the Big Four should take the chair be abolished, and that the Conference be free to elect its own chairman. The *Salle des Pas Perdus* resounded with fervent speeches about the violation of human rights by the Great Powers and their challenge to the principles of democracy. (The plural was used here out of some faint attachment to understatement, for speaker after speaker made it clear that "Great Powers" meant Russia alone.) Mr. Molotov was somehow envisaged as the Toreador of power politics waging a ruthless bull-fight against small nations.

THE scene in the Luxembourg Palace acquired even more of this peculiar coloring when the Commission discussed voting procedure. The spokesmen of the small nations objected particularly to the principle of a two thirds majority. Three or four amendments were, therefore, put before the Commission, all designed to give the small nations some measure of satisfaction. The Great Powers vied with one another in suggesting alternative procedures. Mr. Molotov agreed to the admission of the simple majority vote, provided that recommendations adopted by such a vote would then go before the Council of Foreign Ministers as recommendations not of the Conference itself but of the governments that voted for them.

The British proposal differed from Mr. Molotov's in that it suggested that such recommendations should be considered as the wishes of the Conference itself, but should carry less weight than recommendations adopted by a two thirds majority. The debate over this was a genuine orgy of hair-splitting. Mr. Molotov would hardly have been able to explain in what essentials his proposal differed from the British; and Hector McNeil would hardly have been able to say why the Soviet amendment was as sinister as his criticisms seemed to imply. Even the spokesmen of the small nations, had they calmed down enough to think over the situation, would hardly have been able to say what in fact their sound and fury was about. Even recommendations passed by a two thirds majority would become valid decisions only if the Big Four, including Russia, endorsed them unanimously. And they are, after all, to draw up the final Peace Treaties.

Since this first Peace Conference has given rise to so much heated controversy over the issue of small and big nations, it will perhaps not be out of place to compare the relationships between small and big nations now and in 1919. It will then be seen that, in spite of the now fashionable talk about power politics and dictation by the Great Powers, small nations are incomparably more liberally treated not only by Mr. Byrnes and Mr. McNeil, but even by Mr. Molotov, than they were treated at Versailles, when open diplomacy and equality of nations were the slogans of the day. At Versailles the small nations had no say at all in the rules of procedure, which were made in advance by the Great Powers. And the participants of the Conference were then divided into various categories, such as powers with general interests and powers with particular interests.

Even Mr. Molotov's somewhat clumsy manner appears as a model of tact compared with Clemenceau's harshness towards small nations. If Dr. Evatt had tried to preach equal rights for all nations in Clemenceau's presence, he would certainly have been stopped after his first sentence. Mr. Molotov listens patiently to such sermons and attempts long, monotonous, and rather ineffective counter-arguments to prove that the chairmanship of the Big Four and the two thirds majority rule are in the best parliamentary and democratic traditions.

THIS, of course, makes no sense. Peacemaking is essentially not a parliamentary operation. New Zealand is not a constituency comparable to the Soviet Union, and the People's Federated Republic of Yugoslavia is not a United States. The real line of division is not between small and great powers, but

(CONTINUED ON PAGE 128)

Aluminum in Critical Supply Despite War-Built Capacity

Pittsburgh

• • • **While aluminum** productive capacity expanded more than 700 pct during the war, production now is insufficient to meet current aluminum product demands. This is the result of a combination of circumstances. George R. Gibbons, senior vice-president in charge of sales for Aluminum Co. of America, stated that, while capacity at the end of the war was seven times prewar capacity, economical capacity is somewhere in the neighborhood of only four times prewar capacity.

Precisely, Alcoa's 1939 production, which in effect was the capacity of the industry, was 327 million lb. During the war, capacity jumped to better than 2 billion lb a year for the industry, but the end of the war saw economical capacity established at about 1.2 billion lb a year. This capacity is to all internts and purposes split between Alcoa and Reynolds Metals Co., with Kaiser holding a minor part. Alcoa capacity now is just about 50 pct of the industry, or some 650 billion lb a year.

The shortage of aluminum, Mr. Gibbons said, is largely the result of strikes, slowdowns, material shortages, rising costs and other such factors that have delayed reconversion of the industry. Wartime conditions, he said, placed production emphasis on standard specifications for aircraft and other military uses, but current requirements are for a broad range of alloys and more diversified mill products to meet specific manufacturing and fabricating requirements for vast variety of peacetime goods.

Much of the war built aluminum productive capacity is not now in operation. Low grade bauxite plants operated for the government by Alcoa in conjunction with company owned plants at East St. Louis, Ill., and Mobile, Ala., were leased to cement manufacturers because of sintering capacity that could be used in cement production. Other low grade bauxite capacity, operated by Kalunite at Marysville, Utah; Aluminum, Inc., at Marysville, Utah; ANCOR at Hasleyville, S. C.; Chemical Construction Co., at Salem, Ore.; and Monolith Midwest Corp., at Laramie, Wyo., has probably not yet been disposed of as surplus properties, but is believed to be idle at the present time.

Aluminum reduction plants operated by Alcoa at Los Angeles; Riverbank, Calif.; Burlington, N. J.; Queens, N. Y.; and Massena, N. Y., are also idle. Some of these units will never be put back into operation making aluminum because they are extremely high cost plants. Burlington, now used as an RFC warehouse, Queens, Riverbank, and Los Angeles are the plants least likely to get back into operation. Action on current talk of a reduced power rate for the Los Angeles plant may permit it to be operated.

Aluminum fabricating plant disposal has been rapid, but in every case there have been delays in getting production underway because of changes necessary to peacetime operation. Of the fabricating plants operated for the government by Alcoa during the war, which is in effect almost all of them, the following disposition has been made:

Phoenix, Ariz., extrusions, leased to Reynolds Metals Co.

Chicago, McCook sheet mill, leased to Reynolds Metals Co.

Spokane. Wash., sheet mill, leased to Kaiser Cargo. Inc.

Monroe, Mich., forging plant, not operating and not leased.

New Castle, Pa., press forging plant, not operating and not leased.

Kansas City, Mo., foundry, leased to a manufacturer of bending machines.

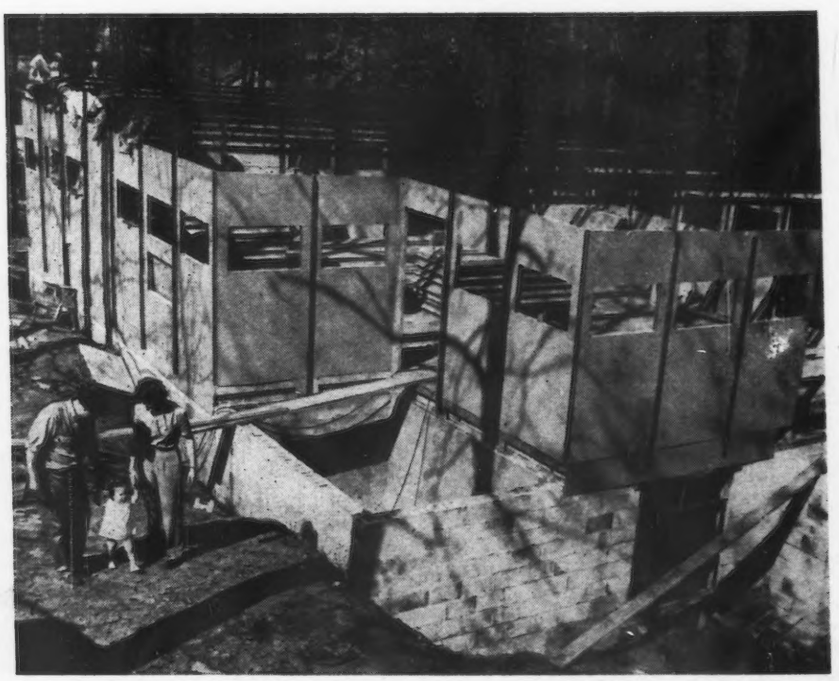
Newark, Ohio, bar and rod mill, bids open for sale or lease.

Canonsburg, Pa., forging plant, lease sought by two non-aluminum manufacturers.

Cressona, Pa., extrusions, up for sale with WAA indicating Alcoa as buyer.

The Cressona plant is the only plant that Alcoa has been able to get because of the government's attempt to break up what it terms the Alcoa monopoly on aluminum. Final sale to Alcoa of the Cressona plant depends upon Dept. of Justice approval. Alcoa attempted to get other government-owned plants, particularly the McCook sheet mill in Chicago, but its offers were always turned down.

INSIDE OUT: *The builder of this novel house applied, in reverse, the principles used in the air-washer manufacturing plant he manages in Atlanta, putting the waterproofed part on the outside. Salvage aluminum sheet covers plywood panels and is used for moldings. The uprights and trusses are steel.*



Mr. Gibbons pointed out that aluminum production since VJ-Day is considerably below the full economical capacity of the industry. Rapid progress is being made in the direction of getting the war-built plants into operation, but complete utilization of the facilities of these plants is still some months off.

Productive capacity on a competitive integrated basis is now in the hands of private industry, Mr. Gibbons said, and the government, except as the holder of plant leases, is no longer a factor in aluminum capacity ownership. Current demand is greater than in any previous peacetime period, and, while much is actual demand, there is a great deal of temporary and abnormal apparent demand resulting from shortages.

Alcoa Gets WAA Nod On Cressona Plant Sale

Pittsburgh

• • • **Subject to approval** of the Dept. of Justice, the sale of the aluminum extrusion plant at Cressona, Pa., to Aluminum Co. of America was announced by the War Assets Administration. The Cressona plant was built by the government during the war at an estimated cost of $29,750,000 and is being sold for $6,500,000 cash. Previously, WAA rejected bids submitted on Aug. 1, then made its own counterproposal to Alcoa which the company accepted.

In addition to the $6,500,000 cash offer for the land, buildings and improvements, Alcoa must pay 60 pct of the original cost of the government machinery and equipment that has been removed but still is available, and 60 pct of the cost of the government-owned machinery still on the premises. Cressona is the only Alcoa operated war plant that the government has shown willingness to sell to Alcoa.

WAA stated that the land and buildings originally cost the government $11,479,157 and the machinery and equipment, most of which has been removed, cost $14,547,217, a total of $26,026,374. A difference of nearly $3¾ million exists between the WAA figure and that established in the third annual report of the Senate after its investigation of the national defense program.

WAA indicated that operations can be resumed in 3 to 4 months at the Cressona, Pa., plant, with an immediate employment of about 1000 people and a substantial increase to follow. Actually, however, considering the amount of equipment that has been removed from the plant, it will take about 4 months to get facilities installed and into partial operation. The figure of 1000 for employment set by WAA is closer the top employment figure at the plant, and this number will not be employed until such time as the plant is practically completely re-equipped.

OPA Changes Export Rules

Washington

• • • **A third** revision of the export price regulation, effective Aug. 23 and designed to simplify export pricing procedure, has been announced by OPA.

A meeting of exporters will be held in the Commerce and Industry Association assembly room, Woolworth Bldg., New York City, on Sept. 5 at which officials of the Office of Export-Import will explain the revision.

Specific formulas have been provided under the revised regulation for determining ceiling prices on exports of iron and steel products.

Fred Bannister in New Post on The Iron Age

New York

• • • **Fred Bannister** has been appointed New England manager of THE IRON AGE, succeeding the late Dwight C. Warren in this post.

Mr. Bannister came to THE IRON AGE early in 1946 as assistant to Mr. Warren, in the New England territory. He had previously been with the Fafnir Bearing Co., New Britain, Conn., for 12 yr, the last five in the capacity of advertising manager. He has long been active in advertising circles and at various times held official posts in the Western New England Chapter of the National Industrial Advertisers Assn.

J & L Buys Benson Plant

Pittsburgh

• • • **The War Assets** Administration announced that the Jones & Laughlin Ore Co., Pittsburgh, has purchased for $4,000,000 the iron ore processing plant that it operated during the war at Benson Mines, N. Y. Jones & Laughlin, WAA said, expects to spend an additional $2,000,000 to improve and modernize the Benson plant.

GHOST TOWN: *Jerome, Ariz., on the slopes of a mountain that has yielded more than $600 million worth of copper, silver, and gold, in the past 60 yr, may become a ghost town next year when Phelps-Dodge Corp., abandons their operations. Hopes for the future hang on developing tourist trade, dude ranches and resort hotels.*

Industrial Briefs . . .

• FORM PARTNERSHIP—Earl S. Patch and C. Robert Talmage announce the formation of the partnership firm of Patch & Talmage to serve industrial companies in the field of powder metallurgy. Offices and laboratory are located at Four S Street, Stamford, Conn.

• OPENS EASTERN OFFICE — Arthur G. McKee & Co., Cleveland engineers and contractors, is opening a designing office in Elizabeth, N. J. The company needs at least 100 draftsmen, according to Robert E. Baker, secretary.

• BUYS BUILDING — Blaw-Knox Co., announced the purchase of a building and property located at 317-321 Penn Ave., Pittsburg, to be used to house its expanding engineering departments. It is at present occupied by the War Assets Administration.

• MOVES DEPARTMENT—Cutler-Hammer, Inc. has moved its Milwaukee office from 728 N 7 St. to 226 E. Juneau Ave., and will concentrate its credit and collection, accounting, order, traffic and estimating departments there.

• MEXICAN COMPANY—The formation of Industria Electrica de Mexico, S. A., a $15,000,000 company for the production of electrical equipment ranging from motors and generators to household appliances, has been announced. Largest of its kind in Latin America, the new enterprise is the result of cooperation between American and Mexican resources. Westinghouse is providing for all technical phases of modern plant layout, operation and product design.

• NEW BUILDING SITE—Purchase of an eight acre tract in Bridgeport, Conn., containing 11 buildings with 230,000 sq ft of floor space, and plans for eventual construction of other buildings to permit wholly integrated manufacturing operations at the new location, were announced by the Bassick Co., a division of Stewart-Warner Corp., Chicago.

• CHANGE OF ADDRESS—The Automotive Safety Foundation announces removal of its headquarters in Washington, from 321 Tower Bldg., to 700 Hill Bldg.

• BUYS NEW LAND — Dulien Steel Products, Inc., has recently purchased ten acres of industrial property in Portland, Ore. The site is beside the main line of the Northern Pacific railroad in the Guilds lake district and will be used for Yard operation. The price paid for the property is understood to be $50,000.

• OPENS DISTRICT OFFICE—Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc., are opening a district sales office in Room 547, McCormick Bldg., 332 S. Michigan Ave., Chicago. John H. Faunce, Jr., has been appointed district manager of sales of the Chicago office. Associated with Mr. Faunce, as a member of the Chicago sales staff, will be Robert M. Bowman.

• ACQUISITION — The property, inventory, equipment and good will of the Fred W. Gehrer Co., Chicago, have been acquired by the Cal-Therm Industries, Inc., a New York corporation doing business in Chicago. The business of Cal-Therm Industries will be merged with the Fred W. Gehrer Co. with offices and manufacturing facilities located at 3542 W. Grand Ave., Chicago.

• HEADS FRENCH INSTITUTE—Georges Delbart has been appointed manager of the recently created French Iron & Steel Research Institute. He was formerly manager of the research laboratory of the Escaut and Meuse steelworks, and of the research department of the Cail engineering works in Denain, France.

Warehouse Resellers Of Alloy Steel Items Given Price Advance

Washington

• • • **Effective Aug. 19,** OPA authorized warehouse resellers of alloy steel products, screen wire cloth, nails, brads, staples and bale tie wire to add to their maximum prices the amount of increases recently granted producers. The price agency said that the action was taken on the basis of approved wage increases granted by resellers.

As a matter of clarification, provision was made that warehouse resellers of iron and steel products, who truck them to buyers at a cost less than that of ordinary freight, need not deduct the resultant savings from their ceilings unless trucking services were specifically requested by the buyer. OPA explained that it was not the intent of the regulation to require deductions in cases where the cost of trucking was less than that of rail shipment.

In an action effective May 10, 1946, trucking was defined as a special delivery service when asked by the buyer and resellers were authorized to include in their delivered prices the amount by which truck delivery costs exceeded freight from the shipping point to the destination. However, prior to this action, special delivery service regulations also required deductions to be made whenever the actual cost of a special delivery service was less than freight.

In another change, OPA will allow warehouse resellers to include in their maximum prices for prime uncoated or coated hot and cold-rolled steel sheets and strip the specified extras for drawing quality. This action is necessary to reflect for resellers the new list of extras which were allowed producers for drawing quality on July 11, 1946, retroactive generally to Feb. 15, 1946.

In addition, four products were added to those for which the drawing quality extra is allowed. They are galvanized and galvannealed sheets, which were erroneously excluded in the initial action, and long terne and enamelling sheets.

Construction Steel...

New York

• • • **Fabricated steel awards** this week included the following:

3250 Tons, Oakland, Calif., crossing over Southern Pacific & Western Pacific R. R. tracks at 5th Ave., Eastshore Freeway, to Midland Structural Steel Co., Cicero, Ill.

900 Tons, Wilmington, Calif., main building superstructure, 2nd unit, Harbor Steam Plant, to Bethlehem Pacific Coast Steel Corp., San Francisco.

475 Tons, State of Iowa, highway bridge, to Pittsburgh-Des Moines Steel Co.

425 Tons, Milwaukee, Wis., Joseph Schlitz Brewing Co., building, to Wisconsin Bridge & Iron Co.

350 Tons, Grand Coulee, Wash., 324 trashracks, Grand Coulee pumping plant, Bureau of Reclamation, Denver, Spec. 1324, to Treadwell Construction Co., Midland, Pa.

300 Tons, Everett, Mass., Monsanto Chemical Co. plant addition, to Bethlehem Fabricators, Bethlehem, Pa.

280 Tons, Grand Coulee, Wash., structural steel for warehouse, Bureau of Reclamation, Denver, Spec. 1341, to American Bridge Co., Pittsburgh.

250 Tons, Philadelphia, Piasecki Helicopter Co., building, through Wark & Co., to Lehigh Structural Steel Co.

240 Tons, Buffalo, Flint & Kent department store addition by Siegfried Construction Co., to R. S. McManus Steel Construction Co., Buffalo.

200 Tons, Buffalo, University of Buffalo Engineering School by John W. Cowper Co., to Bethlehem Steel Co., Bethlehem, Pa.

200 Tons, Barnstable, Mass., Oyster Harbors bridge, to American Bridge Co., Pittsburgh, through Berke-Moore, Inc., contractors.

140 Tons, State of Iowa, highway bridges, to Pittsburgh-Des Moines Steel Co.

138 Tons, Friant, Calif., highway bridge, Friant-Kern Canal, Bureau of Reclamation, Denver, Spec. 1294, to American Bridge Co., Pittsburgh.

132 Tons, Odair, Wash., structural steel for switchyard, Grand Coulee power plant, Bureau of Reclamation, Denver, Spec. 1360, to Muskogee Iron Works, Dallas, Tex.

116 Tons, Kingman, Ariz., structural steel for switchyards, Parker power plant, Bureau of Reclamation, Denver, Spec. 1370, to Muskogee Iron Works, Dallas, Tex.

110 Tons, Clearfield, Pa., office building for Bell Telephone Co., to Bethlehem Steel Co., Bethlehem, Pa.

100 Tons, York, Pa., York Corp., galvanizing building, to Bethlehem Steel Co., Bethlehem, Pa.

• • • **Fabricated steel inquiries** this week included the following:

11,000 Tons, Gallup, N. M., railroad bridge for Atchison, Topeka & Santa Fe R. R.

600 Tons, Toledo, Ohio, chemical specialties building for E. I. du Pont de Nemours Co., bids in.

500 Tons, Milwaukee, transformer tower, Wisconsin Electric Power Co.

408 Tons, Northumberland County, Pa., bridges LR 161 Section 11, Pennsylvania Dept. of Highways, bids due Sept. 11.

325 Tons, Orange, Tex., building, du Pont de Nemours & Co.

300 Tons, Morehead, Minn., pulp dryer building, American Crystal Sugar Co.

275 Tons, Philadelphia, warehouse for Radbill Oil Co., through Frank J. Larkin, contractor, bids in.

180 Tons, Montgomery County, Pa., bridge for Pennsylvania Dept. of Highways, bids due Sept. 6.

175 Tons, York, Pa., storage building for American Chain & Cable Co.

125 Tons, Bridesburg, Pa., industrial building for Frank V. Warren Co., through Charles Lennig & Co., bids in.

• • • **Reinforcing bar awards** this week included the following:

1375 Tons, Oakland, Calif., crossing over Southern Pacific & Western Pacific R. R. tracks at 5th Ave., Eastshore Freeway, to Soule Steel Co., San Francisco.

1000 Tons, Philadelphia, building for Smith, Kline & French, through Barclay White, to Bethlehem Steel Co., Bethlehem, Pa.

• • • **Reinforcing bar inquiries** this week included the following:

400 Tons, Providence, veterans hospital.

350 Tons, Milwaukee, service tunnel, Blatz Brewing Co., previously reported as 200 tons.

292 Tons, Los Angeles, County Purchasing Agent, Los Angeles, Quot. 463, deformed reinforcing steel bars, bids open Aug. 22.

114 Tons, Napa County, Calif., two bridges, Napa-Lake County line, California Div. of Highways, Sacramento, bids open Sept. 11.

• • • **Plate awards** this week included the following:

3760 Tons, East Chicago, Ind., gas holder for Northern Indiana Public Service Co., to Koppers Co.

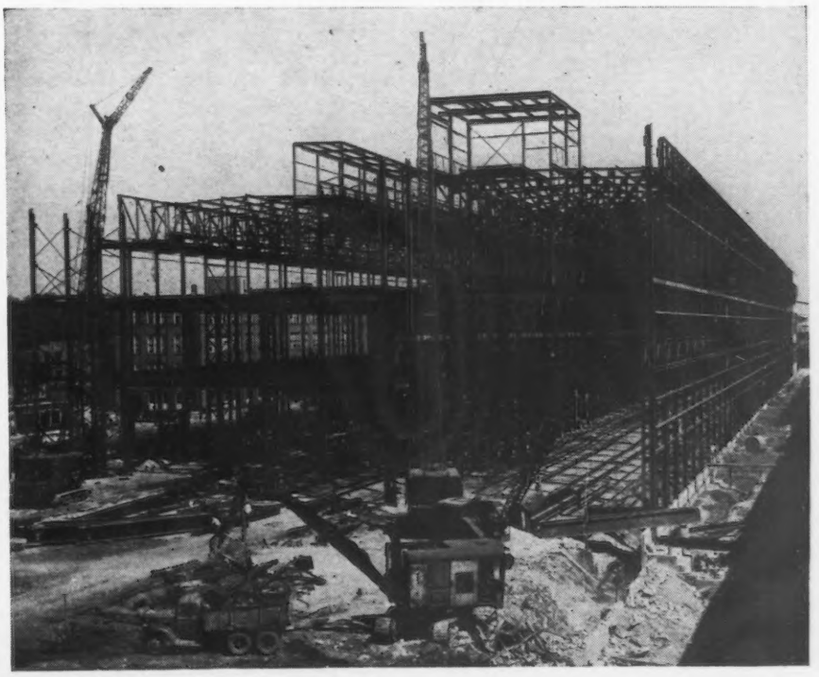
Negotiates License For Output of Hi-Bond Bar

Chicago

• • • **Negotiations** by Carnegie-Illinois and other subsidiaries of the U. S. Steel Corp. for a license to manufacture and sell the Inland Hi-Bond reinforcing bar for concrete construction have been completed, according to H. H. Straus, vice-president of Inland Steel Co., which was responsible for the development of the bar. As a result of the licensing agreement, he said, the reinforcing bar will soon be available in greater quantities throughout the United States.

When it was first announced in the fall of 1943, the reinforcing bar attracted wide attention because of its unique design, which offered a bearing area more than double that of the usual commercial types of reinforcing bars. Subsequently, independent tests conducted by the U. S. Bureau of Standards and university laboratories showed that the bar contributed to sounder and more economical reinforced concrete construction through an improved bond that made possible more efficient transfer of stress at splices, better crack control, superior resistance to slip and an opportunity to design for higher stresses.

9500 TONS OF STEEL: *Largest structure in Buick's new building program, this 900,000-sq ft plant is part of a program to increase Buick capacity by 40 pct over the prewar figure. It is 1446 ft long and half a block wide.*



MACHINE TOOLS

. . . News and Market Activities

Surplus Cuts Machine Tool Demand

• • • **Despite July shipments,** orders and cancellations, which are expected to paint a rather cheerful picture, major segments of the machine tool industry report that demand is gradually trending downward; production schedules in many plants are going down, and a stock condition for some is coming up pretty fast.

Most apparent cause of this condition is the surplus, sales of which are expected to hit the machine tool industry in the immediate vicinity of the solar plexus during the six months ahead.

Foreign business is good, and playing a more important part each month in new orders placed and in the backlogs. Such business is of course, one of the major "outs" for the builder in a period of diminishing demand, when the country is either tooled up, or able to tool up from a pool of low-cost machines, many of which are as efficient as some of the new ones coming off the line.

Telegraphing the punch is the recent announcements by War Assets Administration that a national committee on metalworking machinery and equipment has been established to stimulate sales of this type of surplus property needed for "industry reconversion."

Similar committees, the announcement states, will be established in each of WAA's 33 regional offices. These committees will serve in an advisory capacity.

The national committee is representative of the contract dealers as to size, geographic location, membership in trade organization, and the three segments, manufacturers, dealers in used machinery and equipment and dealers in new machinery and equipment. Regional committees will be formed on the same patterns as the national committee.

Functions of the committees will be to discuss and make recommendations concerning all aspects of problems relating to increasing the volume of sales. Conclusions and recommendations of the meetings will be studied by the Metalworking Equipment Sales Div. of WAA with a view to applying them to disposal problems.

Thus committee members, national and regional, serving without compensation per diem or travel expense, will probably materially assist in making surplus sales more of a bugaboo to the industry than they are at present.

In Detroit, except in the highly specialized machine tool field, there is only fair activity in machine tool sales. Some builders report cancellations coming through, but the volume as yet has not reached alarming proportions, and the number of new orders being placed has held up reasonably well. A substantial number of potential buyers of surplus machines have given up primarily because of the interminable delays encountered in trying to make a purchase, as is the case in other areas.

Deliveries on special purpose equipment are now quoted at 9-10 months, and several builders of both standard and special purpose types have been forced to warehouse finished equipment because motors are unobtainable. The shortage of gray iron castings, bearings and electrical switch gears is also being felt.

According to a recent report to members of the American Gear Manufacturers' Assn., 2353 gear and finishing machines of standard type are in stock in WAA warehouses. These machines are in addition to equipment held on the premises of contractors. Included on the list are 321 hobbers; 280 gear shapers, 152 spur, external only; 275 spur and helical, external and internal, and other items.

In Cincinnati there has been little change in production, but a step-up is reported in the offing. Ordering is about the same, but with the strike on the Great Lakes, there is some anxiety about the availability of material, although for the most part, deliveries from the Cincinnati area are by rail.

In Boston, and the East, demand for new equipment and surplus tools has abated. While interest is still shown in the WAA pool, those in charge of sales admit that the big users have, or nearly have, covered their requirements and that most buyer interest is lukewarm.

Some builders expect to get some sizable orders before the end of 1946, but aside from this optimistic rumor, manufacturers are managing to maintain plant operating schedules and many have enough unfilled business, domestic and foreign, to keep going for several months.

Brand Name Ruling

Washington

• • • **Effective Aug. 20, brand name sellers of machines, machine parts and industrial equipment who do not make products sold under their brand names, will not be required to absorb wholly increases in ceiling prices granted their suppliers. However, the Price Control Extension Act of 1946 requires that margins be maintained at Mar. 31, 1946, levels for wholesalers and retailers.**

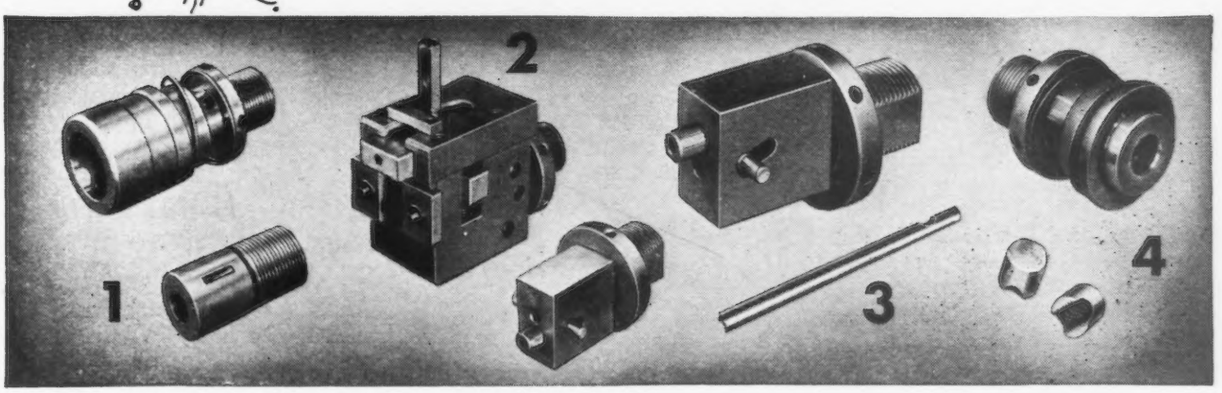
This provision of the act, OPA said in announcing Amendment No. 51 to RMPR136—Machines, Parts, and Industrial Equipment, will be carried out as it affects brand name sellers of these products, who will no longer be designated as manufacturers under this regulation. The affected provision of the act provides that sellers who have other manufacturers make or process the machines and sold under their brand names and who serve as wholesalers or retailers, may increase their prices the same percentage as their net invoiced costs are raised by their suppliers. Mail order houses selling these products under their brand names are affected by OPA's action.

BROACHING *is One Business Where You Need* "PULL"

Be Sure You Have The Right *American* Broach Pull Head

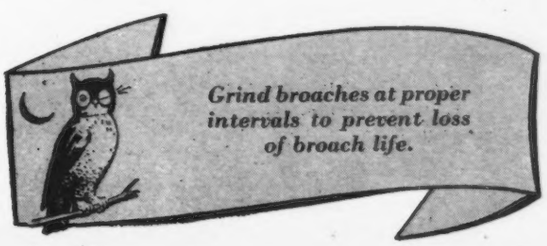
TO GIVE your broaches and broaching machines a maximum degree of operating time, you need quick-connecting broach pull heads. *American* offers a complete line of pull heads—the *right* head for every broaching operation. Each *American* model is designed with a particular purpose in mind. All are engineered and built by broaching experts.

To help you get the most from your broaching equipment, *American* has published an illustrated booklet on broach pull heads and their uses. Write for free copy. It is part of *American's* complete broaching service—machines, tools, and engineering.



Four types of *American* Broach Pull Heads are illustrated. (1) Automatic 4-Jaw Type Puller for horizontal or pull up use. A similar model, with chip shield, is made for pull down use. Standard sizes for shanks from ¼″ to 3½″ diameter. (2) Automatic Keyway Broach Pull Head for use with keyway square, rectangular, and oval broaches. Broach is rigidly held in proper alignment. Set of adapters permits using old style threaded keyway broaches with this head. (3) Automatic Pin Type Puller for use with broaches having shanks ½″ in diameter or smaller. Holds shank by means of a half-round groove cut across the pulling end. Automatically provides positive radial positioning. (4) Type "V" Quick-Change Broach Puller for use with broaches having old style threaded shank. The two-piece jaws are quickly and easily removed while head is in machine. Eliminates necessity of screwing broach into place. Replaceable jaws furnished for all sizes of threads up to 1″ diameter.

Slotted type broach pullers and ordinary threaded broach pullers, not illustrated, are also available.



MEMBER BROACHING TOOL INSTITUTE

American BROACH AND MACHINE CO.

ANN ARBOR, MICHIGAN

•

BROACHING MACHINES
PRESSES
BROACHING TOOLS
SPECIAL MACHINERY

DIVISION OF SUNSTRAND MACHINE TOOL CO.

NONFERROUS METALS

. . . News and Market Activities

Platinum Price May Not Affect Industrial Uses

New York

• • • **The jump in** the price of platinum to $83.00 per oz Troy since the end of April when the platinum group metals were decontrolled represents a rise from the ceiling price of $35.00. Meanwhile the price of palladium which has been used widely during the war to replace platinum in jewelry has remained at the ceiling of $24.00 per oz. Ruthenium, which is used as a hardener for palladium to the extent of 4.5 pct, has increased from a price of $35.00 per oz to a current price of $70.00.

The increased price of platinum is believed not likely to curtail its consumption for industrial applications, according to an informed source. This is said to be due to the resistance of platinum to deterioration by corrosion in the presence of acids and other chemicals and resistance to oxidation, to the small quantities used in certain applications, or to the long life expectancy of equipment employing larger quantities. It is true, however, that the specifying engineer may be expected to compare the life and service advantages of platinum at $83.00, or higher, if there is a further rise, with the price and life of other materials.

The principal source of platinum is Canada, where it is largely a by-product of the recovery of nickel from nickel copper ores. Production is limited by the volume of concentrates being handled by the nickel refineries there, which is in turn dependent on the nickel order position. It is understood that the release of platinum to the jewelry trade is still being limited in view of industrial needs. However, the price increase is said to mean little to jewelers who are ready to pass the higher price on to their customers.

•

New Zinc Mines Subsidized

Washington

• • • **To place all** domestic zinc mines on the same eligibility basis under the Premium Payment Plan for copper, lead and zinc, CPA announced on Aug. 16 that zinc mines which started operations after Oct. 27, 1943, would be eligible for the same premium payments as older producers, effective Sept. 1.

Zinc mines starting operations after Oct. 27, 1943 have been eligible for "A" premiums and have not been permitted to participate in the higher "B" and "C" premiums. Lead and lead-zinc mines were made eligible for such premiums on Feb. 19, 1946.

•

Aluminum Ingot Prices Up

New York

• • • **Remelted aluminum** ingot prices have been increased during the week with No. 12 foundry alloy going to a range of 12.50¢ to 12.75¢ per lb; and deoxidizing grades, No. 2 to 13.00¢; No. 3 to 12.00¢; No. 4 to 11.50¢. These aluminum ingot prices have been increased because of the increasing tightness of aluminum scrap throughout the country.

A study of the nation's aluminum supply position appears on p. 110 of this issue.

•

Bolivian Tin Prices Set

New York

• • • **A base price** of 62.5¢ per lb is reported to have been established for the metal content of tin concentrates imported from Bolivia in a new contract between the Office of Metals Reserve and Bolivian tin producers represented by Dr. Mauricio Hochschild.

The contract is reported to contain two retroactive bonus clauses which become effective when the annual production reaches 17,600 tons metal content. From Jan. 1 to June 30 the bonus is said to be 1¢ per lb; from July 1 to the end of the year, the bonus is to be 3¢ per lb. This brings the cost of Bolivian tin concentrates in current production to 65.5¢ per lb, assuming the minimum production quota is reached during the year. Dr. Hochschild is reported to have estimated that Bolivian concentrate production would provide 18,000 tons of fine tin for the United States this year.

•

Copper, Nickel Decline

Ottawa

• • • **Canadian copper** production for May totaled 30,993,228 lb compared with 31,886,954 lb in April and 41,165,776 lb in May 1945. For the first five months of this year total copper production in Canada amounted to 154,943,655 lb, compared with 214,335,735 lb in the corresponding period of 1945 and 235,486,231 lb in the 1944 period. For the full year 1945 copper output in Canada amounted to 477,950,879 lb against 547,070,117 lb in 1944.

Nickel output for May was 14,733,775 lb against 18,479,626 lb in April and 23,484,009 lb in May 1945. Total production for the five months was 75,163,736 lb compared with 113,155,160 lb in the same period last year.

•

Net Profit Decreases

New York

• • • **The report of** The International Nickel Co. of Canada, Ltd., and subsidiaries for the 6 months ended June 30, 1946, issued by Robert C. Stanley, chairman and president, shows net profit of $12,211,663 after all charges. This compares with net profit of $13,527,594 in the corresponding period a year ago.

Nonferrous Metals Prices

Cents per pound

	Aug. 14	Aug. 15	Aug. 16	Aug. 17	Aug. 19	Aug. 20
Copper, electro., Conn.	14.375	14.375	14.375	14.375	14.375	14.375
Copper, Lake, Conn.	14.375	14.375	14.375	14.375	14.375	14.375
Tin, Straits, New York	52.00	52.00	52.00	....	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25	8.25	8.25
Lead, St. Louis	8.10	8.10	8.10	8.10	8.10	8.10

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$30.00
Cadmium, del'd	$1.25
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	14.375
Copper, electro, New York	14.125
Copper, lake, Conn. Valley	14.375
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$125.00
Lead, St. Louis	8.10
Lead, New York	8.25
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$99 to $100
Nickel, electro, f.o.b. refinery	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$83.00
Silver, New York, cents per oz.	90.125
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.69
Zirconium copper, 6 pct Zr, per lb contained Zr	$ 6.00

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No. 2)	12.50 to 12.75
Aluminum, deoxidizing	
No. 2	13.00
No. 3	12.00
No. 4	11.50
Brass Ingot—ceiling prices	
85-5-5-5 (No. 115)	15.50
88-10-2 (No. 215)	18.75
80-10-10 (No. 305)	18.25
No. 1 Yellow (No. 405)	12.50

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded shapes	Rods	Sheets
Copper	25.66	....	25.81
Copper, H.R.	....	22.16	....
Copper drawn	....	23.16	....
Low brass, 80%	....	24.35	24.66
High brass	....	....	23.67
Red brass, 85%	....	24.67	24.98
Naval brass	23.84	22.59	28.53
Brass, free cut	....	18.53	....
Commercial, bronze	....	25.50	25.81
Manganese bronze	27.45	25.95	32.03
Phosphor bronze, A, B, 5%	....	43.70	43.45
Muntz metal	23.59	22.34	26.78
Everdur, Herculoy, Olympic or equal	....	29.82	30.88
Nickel silver, 5%	....	34.44	32.38
Architectural bronze	22.50	....	....

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢, 52S-O, 67¢ 24S-T, 71¢: base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢: 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb and over.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.3¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb and over.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 27.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢ 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21c; 56S, 30.5¢; B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

(Continued, See Next Column)

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb or more, 46¢ a lb; 25 to 90 lb, 56¢; less than 25 lb, 66¢.

NONFERROUS SCRAP METAL QUOTATIONS

†*(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)*

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	11.50
No. 1 tinned copper wire, No. 1 tinned heavy copper	11.50
No. 2 wire, mixed heavy copper	10.50
Copper tuyeres	10.50
Light copper	9.50
Copper borings, No. 1	11.50
No. 2 copper borings	10.50
Lead covered copper wire, cable	....*
Lead covered telephone, power cable	....*
Insulated copper	....*

OPA Group 2†

Bell metal	17.25
High grade bronze gears	15.00
High grade bronze solids	....*
Low lead bronze borings	....*
Babbitt lined brass bushings	14.75
High lead bronze solids	....*
High lead bronze borings	....*
Red trolley wheels	12.50
Tinny (phosphor bronze) borings	12.25
Tinny (phosphor bronze) solids	12.25
Copper-nickel solids and borings	11.00
Bronze paper mill wire cloth	11.25
Aluminum bronze solids	10.75
Soft red brass (No. 1 composition)	10.75
Soft red brass borings (No. 1)	10.75*
Gilding metal turnings	10.25
Contaminated gilded metal solids	10.25
Unlined standard red car boxes	10.00
Lined standard red car boxes	9.50
Cocks and faucets	9.50
Mixed brass screens	9.50
Red brass breakage	9.25
Old nickel silver solids	7.60
Old nickel silver borings	7.50
Copper lead solids, borings	6.75
Yellow brass castings	7.50
Automobile radiators	8.75
Zincy bronze solids, borings	9.75

OPA Group 3†

Fired rifle shells	9.50
Brass pipe	8.75
Old rolled brass	8.25
Admiralty condenser tubes	8.75
Muntz metal condenser tubes	8.25
Plated brass sheet, pipe reflectors	7.75
Manganese bronze solids	8.00[1]
Manganese bronze solids	7.00[2]
Manganese bronze borings	7.25

OPA Group 4†

Refinery brass	6.00*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 pct. [2] Lead content 0.41 to 1.00 pct.

Brass Mill Scrap†

Briquetted cartridge brass turnings	10.375
Cartridge brass turnings, loose	9.625
Loose yellow brass trimmings	9.625

Aluminum

Plant scrap, segregated

2S solids	8.50 to 9.00
Dural alloys, solids 14, 17, 18, 24S, 25S	6.00 to 6.25
turnings, dry basis	1.50 to 1.75
Low copper, alloys 51, 52, 61, 63S solids	8.00 to 8.50
turnings, dry basis	5.00 to 6.50

Plant scrap, mixed

Solids	4.25 to 4.50
Turnings, dry basis	1.50 to 1.75

Obsolete scrap

Pure cable	6.50 to 7.50
Old sheet and utensils	5.00 to 5.50
Old castings and forgings	5.00 to 5.50
Pistons, free of struts	4.00 to 4.50
Pistons, with struts	2.50 to 3.00
Old alloy sheet	2.00 to 2.50

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	7.50
Engravers, lithographers plates	7.50
Old zinc scrap	5.75
Unsweated zinc dross	6.00
Die cast slab	5.50
New die cast scrap	5.45
Radiator grilles, old and new	4.50
Old die cast scrap	4.00

Lead

Deduct 1.40¢ a lb from refined metal basing point prices for refinery charge on used battery plates.

Soft lead scrap	7.50

Nickel

Ni content 98+%, Cu under ½%, 23¢ per lb; 90 to 98% Ni, 23¢ per lb contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	29.75
Electrodeposited	23.47
Rolled, oval, straight, delivered	23.72
Curved, 18 in. or longer, delivered	23.72
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	27.25
Zinc, cast, 99.99, 15 in. or longer	17½
Nickel, 99 pct plus, frt allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	95⅞

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 1-5 bbls	34.00
Copper sulphate, 99.5, crystals, bbls	7.75
Nickel salts, single, 425 lb bbls, frt allowed	13.50
Silver cyanide, 100 oz lots, per oz.	0.749
Sodium cyanide, 96 pct, domestic, 125 lb drums	15.00
Zinc cyanide, 100 lb drums	33.00
Zinc sulphate, 89 pct, crystals, bbls, frt allowed	6.35

SCRAP

. . . News and Market Activities

New OPA Rulings Leave Industry Cool

New York

• • • **The new OPA** rulings on scrap leave the trade rather indifferent but somewhat more confused. It is known, for instance, that several Navy yards have been selling "prepared scrap" to dealers at well above the prepared ceiling price. Under the new ruling effective Aug. 20 such prices will no longer be possible since dealers are now required to abide by prepared ceiling prices.

The requirement that various grades in a mixed shipment be physically segregated is said to be nothing new, merely a reiteration of present trade rules. Observers here do not believe its repetition will have much affect on current upgrading practices.

Details of the new OPA rulings appear on pp. 97 and 98 of this issue.

Many dealers have expressed satisfaction with the prepared scrap ceiling rule because they claim that even with salvage operations the payment of prices well above the prepared ceiling caused cutthroat competition in the trade and speculation in anticipation of a general price increase.

It is generally conceded that no immediate improvement in shipments will occur until OPA either grants a price increase or somehow kills the present crop of price hopes.

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PITTSBURGH—The scrap outlook here continues tight but supplies are a trifle more elastic than a week ago. Most of the improvement comes from a slightly better flow of material from fabricators and railroads. Dealers on the other hand are still holding substantial amounts of scrap in view of the confusion in the trade as to the definite action OPA will finally take on the request for higher price ceilings on scrap. When it is apparent that there will be a price increase or that there will not be one then the flow of scrap which has been accumulating in yards will be sufficient to prevent any large scale shutdowns. Meanwhile while the mills are not advertising the fact many of them are operating at high levels on the scrap accumulations which were built up during the steel strike. This material is still moving from yards to steel mills.

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CHICAGO—More scrap is moving than the sellers like to admit. Considerable amounts continue to be stocked and held for higher prices. Four large sellers approached local banking institutions last week for loans with which to further augment yard inventories. The U. S. Steel Corp. has so far imported over 24,000 tons of scrap from the Pittsburgh area by boat, and plans to continue the practice. Mill inventories are remaining steady with new shipments just meeting current demand. Steel officials predict pressure will be applied on OPA for higher prices by the steel producers if the situation gets worse.

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PHILADELPHIA—Mills in this area are desperately in need of scrap and have reduced the numbers of openhearths because of the outlook for scrap and pig iron. Mills report that they are further handicapped by the light weight of current scrap which prevents a heavier scrap charge with additions of graphite to the heat. One mill official charges that yards are well stocked and holding back shipments for a price increase. Reports have been received of cast scrap deliveries at more than the $30 figure.

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DETROIT—To the inevitable ill-effects of shortages of foundry scrap should now be added the uncertainties that result from using scrap of unidentified origin in the cupola. In the face of the short scrap supply several production foundries in this area have tried using country scrap. One result has been that casting losses which ordinarily run about 1 pct quickly shot up to 8 or 9 pct. No favorable effect of the recent increase in the price of pig iron has been observed here and there is little feeling that the effect will be noted soon if at all. Meanwhile, the partial maritime shutdown is being carefully watched for its possible effect on the pig iron and scrap situations. Scrap is moving only hesitantly with a price rise pending.

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BOSTON—Pennsylvania interests are offering local yards a premium of $3.50 a ton for breakable cast and $1 a ton for turnings on a yard to yard basis. Most yards, howsever, continue to wait for Washington action on prices. The $64 question is, "Why does government delay in stating its price position?" Otherwise interest has centered in the local Navy yard sale Aug. 20 of following tonnages, estimated and not guaranteed: 400 tons No. 1 steel; 300 tons No. 2 steel; 750 tons unprepared; 300 tons light iron; total 1750 tons. No award announced as yet.

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NEW YORK—Dealers are getting slightly better receipts as production scrap begins to come out in somewhat better volume. Nevertheless brokers are not moving a much greater volume and there is evidence that stocks in dealers' yards are being built up to the point where neither space nor capital reserves can permit much further accumulation.

BUFFALO—Pessimism threw a deeper cloud over the scrap market this week. Dealers and consumers alike could see little chance of increased supplies with rail and industrial lists lighter if anything. Cross trading between producers and fabricators is becoming more of a factor. Instead of ship loads of scrap coming down by lake from midwestern plants as in previous years, local mills are picking up scattered carload lots in that area.

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CLEVELAND—All grades continue in very short supply, with only production scrap moving. While a scrap price increase is momentarily expected, a good deal of trading is going on, according to some sources. It appears now that the real damage has been done and that a price increase probably cannot prevent another and possibly more severe scrap pinch this winter. A shortage of cars is hampering some consumers, and while shipments are at approximately last week's levels, some consumers in the valley are practically on a car-to-furnace basis.

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ST. LOUIS—Hoping for an early increase in price of scrap iron, holders of supplies are making almost no sales and no shipments of quantity are expected until it is decided whether there will be a price increase. Granite City Steel Co. which resumed operations of four openhearth furnaces is asking for shipments of scrap already purchased. St. Louis-San Francisco Rwy. has a list of 20 cars.

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BIRMINGHAM—Except for some railroad tonnages, scarcely any scrap is moving in this area. As material is held back pending possible OPA price action, inventories at mills continue to shrink although operations have yet to be affected.

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CINCINNATI—The market here is about as tight as it has ever been, with available scrap not too plentiful while melters' reserves are shrinking. Inventories are now from zero to approximately 2 weeks' operations supply. While there is a feeling that some scrap is being held from the market in anticipation of an OPA raise in prices, the general feeling is that this would not be sufficient to relieve the present acute shortage, as well as care for winter needs. Foundries are particularly pleading for scrap, and dealers and brokers are generally serving them on a truckload basis.

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TORONTO — Steadily expanding demand for iron scrap with no improvement in supply features the Canadian market. The shortage of pig iron due to strikes at the big producing plants, has been reflected in larger demand for scrap for foundry use and dealers state that all incoming materials are quickly disposed of to melters awaiting delivery No large tonnages of cast or stove plate have been offered recently and some foundries have closed down due to shortages of raw materials. There has been a sharp reduction

IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used they indicate the OPA ceiling price to which must be added brokerage fee and adjusted freight.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Angles & splice bars	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast.	20.00*
Rails 3 ft. and under	22.25*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
Nos. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	$13.06 to 14.15*
Machinery cast	20.00*
Breakable cast.	16.50*
Stove plate	19.00*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*
Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.32*
No. 1 cupola cast.	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast.	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	12.50*
Locomotive tires, uncut	21.00*
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast.	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	12.00*
Shoveling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	$18.50 to 19.50*
Structural and plate	18.50 to 19.50*
No. 1 cast	20.00*
Stove plate	19.00*
Steel axles	18.50*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00
Rails 3 ft. & under	21.00*
Cast iron carwheels	19.00*

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast.	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Stove plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	14.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	$18.00*
No. 1 hvy. melting	17.00*
No. 2 hvy. melting	17.00*
No. 2 bales	$15.00 to 15.75
No. 3 bales	8.50 to 9.25
Mach. shop turn.	6.50 to 7.25
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00
No. 2 hvy. melting	17.00
No. 1 bales	$16.00 to 17.00
No. 2 bales	15.50 to 16.00
No. 3 bales	8.00 to 9.00
Mach. shop turn.	7.00
No. 1 cupola cast.	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	$14.50*
No. 1 & No. 2 hvy. melting	14.50*
Elec. furn. 1 ft. und.	$14.00 to 15.00
No. 1 cupola cast.	20.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

[Advances over past week in **Heavy Type**; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.]

Flat-Rolled Steel: (cents per pound)	Aug. 20, 1946	Aug. 13, 1946	July 16, 1946	Aug. 21, 1945
Hot-rolled sheets	2.425	2.425	2.425	2.20
Cold-rolled sheets	3.275	3.275	3.275	3.05
Galvanized sheets (24 ga.)	4.05	4.05	4.05	3.70
Hot-rolled strip				
6-in. and under	2.45	2.45	2.45	2.10
Over 6 in.	2.35	2.35	2.35	2.10
Cold-rolled strip	3.05	3.05	3.05	2.80
Plates	2.50	2.50	2.50	2.25
Plates, wrought iron	4.112	4.112	4.112	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.00	$5.00	$5.00	$5.00
Tinplate, electro (0.50 lb)	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.55	4.55	4.55	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.50	2.50	2.50	2.25
Cold-finished bars	3.10	3.10	3.10	2.75
Alloy bars	2.92	2.92	2.92	2.70
Structural shapes	2.35	2.35	2.35	2.10
Stainless bars (No. 302)	25.97	25.97	25.97	24.00
Wrought iron bars	4.76	4.76	4.76	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	3.05	3.05	3.05	2.75
Wire nails	3.75	3.75	3.75	2.90
Rails: (dollars per net ton)				
Heavy rails	$43.39	$43.39	$43.39	$43.00
Light rails	49.18	49.18	49.18	45.00
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$39.00	$39.00	$39.00	$36.00
Sheet bars	38.00	38.00	38.00	36.00
Slabs, rerolling	39.00	39.00	39.00	36.00
Forging billets	47.00	47.00	47.00	42.00
Alloy blooms, billets, slabs	58.43	58.43	58.43	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.30	2.30	2.30	2.15
Skelp	2.05	2.05	2.05	1.90

Pig Iron*: (per gross ton)	Aug. 20, 1946	Aug. 13, 1946	July 16, 1946	Aug. 21, 1945
No. 2 foundry, Phila.	$30.43	$30.43	$30.34	$26.84
No. 2, Valley furnace	28.50	28.50	28.50	25.00
No. 2, Southern, Cin'ti	27.80	27.80	28.94	25.44
No. 2, Birmingham	24.88	24.88	24.88	21.38
No. 2 foundry, Chicago†	28.50	28.50	28.50	25.00
Basic, del'd eastern Pa.	29.93	29.93	29.84	26.34
Basic, Valley furnace	28.00	28.00	28.00	24.50
Malleable, Chicago†	28.50	28.50	28.50	25.00
Malleable, Valley	28.50	28.50	28.50	25.00
L. S. charcoal, Chicago	42.34	42.34	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For cariots at seaboard.
* Prices retroactive to May 29; the price increase should be reflected in THE IRON AGE Comparison of Prices table since June 4.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$7.50	$7.50	$8.75	$7.50
Foundry coke, prompt	8.50	8.50	9.85	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	14.375	14.375	14.375	12.00
Copper, Lake, Conn.	14.375	14.375	14.375	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	9.50	8.25
Lead, St. Louis	8.10	8.10	9.50	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

[**Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.**]

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Aug. 20, 1946	2.73011¢ per lb.	$28.13 per gross ton	$19.17 per gross ton
One week ago	2.73011¢ per lb.	$28.13 per gross ton	$19.17 per gross ton
One month ago	2.73011¢ per lb.	$28.13 per gross ton	$19.17 per gross ton
One year ago	2.44076¢ per lb.	$24.61 per gross ton	$19.17 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1946	2.73011¢ July 4	2.54490¢ Jan. 1	$28.13 May 29	$25.37 Jan. 1	$19.17	$19.17
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	$19.17 Jan. 2	$18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

A recent survey among metal products manufacturers showed that in 109 out of 187 cases plans were being made to change a particular product or product part from a heavier metal to aluminum.

Light in weight, aluminum now—through the use of war-developed alloys—has far greater impact resistance and possesses greater tensile strength than ever before. This is the Aluminum Age!

If you are using—or can use—aluminum alloy castings in your product, submit your parts problems to Acme. Acme metallurgists are always ready to help you determine the right alloy for your needs. Acme engineers will assist if desired on any problem of design—to assure that you receive all of aluminum's many plus values.

Your inquiry will receive our prompt attention.

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Patterns · Tools · Aluminum, Brass, Bronze Castings · Engineering

SALES OFFICES: New York Chicago Cleveland Detroit
Pittsburgh St. Louis Washington Minneapolis Flint Milwaukee Denver Dallas

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
INGOTS															
Carbon, rerolling	($33.00 f. o. b. mill)														
Carbon, forging	$38	$38	$38	$38	$38	$38	$38								
Alloy	$48.69	$48.69				$48.69	(Bethlehem, Massillon, Canton, Coatesville=$48.69)								
BILLETS, BLOOMS, SLABS							(Provo=$50.20, Duluth=$41[14])								
Carbon, rerolling	$39	$39	$39	$39	$39	$39	$39	$39				$51[14]	$41		
Carbon, forging billets	$47	$47	$47	$47	$47	(Provo=$58.20, Duluth=$49[14]) $47	$47					$59[14]	$49		
Alloy	$58.43	$58.43				$58.43	(Bethlehem, Massillon, Canton=$58.43)						$60.43		
SHEET BARS	$38	$38		$38		$38	$38	$38	(Canton=$38)						
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢	(Coatesville=2.05¢)						
WIRE RODS [15]															
No. 5 to 9/32 in.	2.30¢	2.30¢		2.30¢	2.30¢		(Worcester=2.40¢)				2.55¢	2.80¢			
SHEETS															
Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.525¢	2.425¢		2.975¢	2.525¢	2.685¢	2.615¢
Cold-rolled [1]	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢	3.275¢		3.925¢	3.375¢	3.615¢	3.635¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.15¢	4.05¢		4.60¢		4.31¢	4.24¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢	3.80¢		4.45¢	3.90¢	4.20¢	4.16¢
Enameling (10 Gage)	3.20¢	3.20¢	3.20¢	3.20¢			3.20¢		3.30¢	3.20¢		3.85¢	3.30¢	3.60¢	3.56¢
Long ternes [2]	4.05¢	4.05¢	4.05¢									4.80¢		4.45¢	4.41¢
STRIP															
Hot-rolled [3] 6 in. and under	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢		2.45¢			2.45¢		3.10¢	2.55¢	2.85¢	2.81¢
over 6 in.	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢		2.35¢			2.35¢		3.00¢	2.45¢	2.75¢	2.71¢
Cold-rolled [4]	3.05¢	3.15¢		3.05¢			3.05¢	(Worcester=3.25¢)					3.15¢	3.45¢	3.41¢
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.95¢	
TINPLATE															
Standard cokes, base box	$5.00	$5.00	$5.00		$5.10			$5.10	$5.10					$5.375	$5.301
Electro, box 0.25 lb	$4.35	$4.35	$4.35					$4.35							
Electro, box 0.50 lb	$4.50	$4.50	$4.50					$4.60	$4.60						
Electro, box 0.75 lb	$4.65		$4.65					$4.75	$4.75						
BLACKPLATE															
29 gage [5]	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢					3.67¢	3.59¢
TERNES, MFG.															
Special coated, base box	$4.55	$4.55	$4.55					$4.65	$4.65						
BARS								(Duluth=2.60¢)							
Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	(Provo, Utah=3.20¢)			2.85¢	3.15¢	2.60¢	2.84¢	2.86¢
Rail steel [6]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢					2.85¢	3.15¢			
Reinforcing (billet) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢			2.70¢	2.75¢	2.45¢	2.61¢	2.69¢
Reinforcing (rail) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢				2.70¢	2.75¢	2.45¢		
Cold-finished [8]	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢	(Detroit=3.15¢)				(Toledo=3.25¢)			3.44¢	3.46¢
Alloy, hot-rolled	2.92¢	2.92¢				2.92¢	2.92¢	(Bethlehem, Massillon, Canton=2.92¢)					3.02¢		
Alloy, cold-drawn	3.62¢	3.62¢	3.62¢	3.62¢		3.62¢							3.73¢		
PLATE								(Coatesville and Claymont=2.50¢, Provo, Utah=3.20¢)							
Carbon steel [13]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢			2.85¢	3.05¢	2.72¢	2.71¢	2.558¢
Floor plates	3.75¢	3.75¢									4.10¢	4.40¢		4.15¢	4.15¢
Alloy	3.79¢	3.79¢			(Coatesville=3.79¢)						4.27¢	4.49¢		4.01¢	3.895¢
SHAPES															
Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢	(Bethlehem=2.35¢)				2.60¢	3.00¢		2.54¢	2.48¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	2.80¢			2.80¢			(Worcester=3.20¢)								
0.51 to 0.75 carbon	4.30¢			4.30¢			(Worcester=4.50¢)								
0.76 to 1.00 carbon	6.15¢			6.15¢			(Worcester=6.35¢)								
1.01 to 1.25 carbon	8.35¢			8.35¢			(Worcester=8.55¢)								
WIRE [9]															
Bright [12]	3.05¢	3.05¢		3.05¢	3.05¢		(Worcester=3.15¢)			(Duluth=3.10¢)		3.55¢		3.44¢	3.41¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.00¢	4.00¢		4.00¢			(Worcester=4.10¢)			(Trenton=4.25¢)		4.50¢		4.39¢	4.339¢
PILING															
Steel sheet	2.65¢	2.65¢				2.65¢						3.20¢		2.99¢	3.01¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville	22.99	24.67	17.01	17.47	20.69	25.29
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.05	25.97	20.02	20.56	24.34	29.75
Plates, P'gh, Middletown, Canton	31.38	29.21	23.28	23.80	28.67	33.00
Shapes, structural, P'gh, Chi	27.05	25.97	20.02	20.56	24.34	29.75
Sheets, P'gh, Chi, Middletown, Canton, Balt.	38.95	36.79	28.67	31.38	35.16	38.49
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.43	23.28	18.39	18.93	25.97	37.87
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.46	30.30	23.80	24.34	34.62	56.26
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Newark, N. J., Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 8 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)*

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., net ton	$43.39
Angle splice bars, 100 lb	2.85
(F.o.b. basing points)	***per net ton***
Light rails (from billets)	$49.18
Light rails (from rail steel)	49.18
	base per lb
Cut spikes	3.65¢
Screw spikes	5.55¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	6.50¢
Track bolts, heat treated, to railroads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$8.50	$17.00
15-lb coating I.C.	9.50	19.00
20-lb coating I.C.	10.00	20.00

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	21.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.72	....
Inconel-clad		
10 pct, f.o.b. Coatesville	26.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	24.96	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	base per keg	
Standard wire nails	$3.75	$4.25
Coated nails	3.75	4.25
Cut nails, carloads	4.85	....
	base per 100 lb	
Annealed fence wire	$3.50	$4.00
Annealed galv. fence wire	3.85	4.35
	base column	
Woven wire fence*	72	90
Fence posts, carloads	74	91
Single loop bale ties††	72	97
Galvanized barbed wire**	79	89
Twisted barbless wire	79	89

*15½ gage and heavier. **On 80-rod spools in carload quantities.
†Prices subject to switching or transportation charges.
††Add 50c a ton.

HIGH TENSILE, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayari R	Otis-coloy	Yoloy	Y-50
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill
Plates	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	.....
Sheets									
Hot-rolled	3.575	3.575	3.575	3.575	3.575	3.575	3.575	3.575	.....
Cold-rolled	4.525	4.525	4.525	.....	4.525	4.525	4.525	4.525	5.225*
Galvanized	.....	.....	.....	.....	.....	5.50	.....	.....	.....
Strip									
Hot-rolled									
Over 6-in.	3.60	3.60	3.60	.....	3.60	3.60	3.60	3.60	.....
6-in & under	3.70	3.70	3.70	.....	3.70	3.70	3.70	3.70	.....
Cold-rolled	4.30	.....	4.30	.....	4.40	.....	4.30	4.30	5.00*
Commodity	.....	.....	.....	.....	.....	.....	4.45	.....	.....
Shapes	.....	3.45	.....	.....	3.45	3.45	3.45	3.45	.....
Beams	.....	3.45	.....	.....	.....	3.45	.....	.....	.....
Bars									
Hot-rolled	3.70	3.70	3.70	.....	.....	3.70†	3.70	3.733†‡	.....
Cold-rolled	.....	.....	.....	.....	.....	.....	.....	4.382†‡	.....
Bar shapes	.....	3.85	.....	.....	3.85	3.85	3.85	3.85	.....
Billets, blooms, slabs (per gross ton)									
Structural	.....	.....	.....	.....	.....	.....	.....	$74.66†	.....
Forging	.....	.....	.....	.....	.....	.....	.....	$82.23†	.....

* 21 gage and lighter. † Alloy extras apply. ‡ Add 0.379¢ for forging grade, heat treated.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe) base price—$200.00 per net ton

	Black	Galv.
Steel (buttweld)		
½-in.	60½	48
¾-in.	63½	52
1-in. to 3-in.	65½	54½
Wrought Iron (buttweld)		
½-in.	17⅞	+4⅜
¾-in.	24⅛	2⅝
1-in. and 1¼-in.	28⅝	9⅛
1½-in.	33	11⅞
2-in.	32⅜	11⅝
Steel (lapweld)		
2-in.	58	46½
2½-in. and 3-in.	61	49½
3½-in. to 6-in.	63	51½
Wrought Iron (lapweld)		
2-in.	24⅞	4⅞
2½-in. to 3½-in.	25⅞	7½
4-in.	28⅛	11⅜
4½-in. to 8-in.	27	10¼
Steel (butt, extra strong, plain ends)		
½-in.	58½	47½
¾-in.	62½	51½
1-in. to 3-in.	64	54
Wrought Iron (same as above)		
½-in.	18⅞	+1⅝
¾-in.	25⅝	4¾
1-in. to 2-in.	33	13
Steel (lap, extra strong, plain ends)		
2-in.	56	45½
2½-in. and 3-in.	60	49½
3½-in. to 6-in.	63½	53
Wrought Iron (same as above)		
2-in.	28⅛	8⅝
2½-in. to 4-in.	34	16¼
4½-in. to 6-in.	32⅜	14⅝

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Seamless Hot-Rolled	Lapweld, Hot-Rolled
2 in. O.D. 13 B.W.G.	16.52	13.90	13.20
2½ in. O.D. 12 B.W.G.	22.21	18.70	17.67
3 in. O.D. 12 B.W.G.	24.71	20.79	19.56
3½ in. O.D. 11 B.W.G.	31.18	26.25	24.68
4 in. O.D. 10 B.W.G.	38.68	32.56	30.55

(Extras for less carload quantities)

40,000 lb or ft and over	Base
30,000 lb or ft to 39,999 lb or ft	5 pct
20,000 lb or ft to 29,999 lb or ft	10 pct
10,000 lb or ft to 19,999 lb or ft	20 pct
5,000 lb or ft to 9,999 lb or ft	30 pct
2,000 lb or ft to 4,999 lb or ft	45 pct
Under 2,000 lb or ft	65 pct

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in., del'd Chicago	$70.33
6-in. to 24-in., del'd New York	69.60
6-in. to 24-in., Birmingham	61.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle for all rail shipment; rail and water shipment less	84.40

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

An increase of 12 pct applies to listings except Large Rivets

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots 10 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

	Consumer
Packages, nuts loose	71 and 10
In packages	71
In bulk	80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets
(½ in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$4.75
F.o.b. Lebanon, Pa.	4.90

Small Rivets
(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws	Percent Off List Consumer
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Effective CaF_2 Content:	Base price per short ton
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$5.45
Old range, non-bessemer	5.30
Mesaba, bessemer	5.20
Mesaba, non-bessemer	5.05
High phosphorus	5.05

Prices are for ore shipped on and after June 24, 1946, and for ore covered by adjustable pricing agreements authorized by Order No. 8, RMPR 113.

These prices do not reflect the recent ICC increase in freight rates.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	19¼¢ to 21½¢
Copper, electrolytic, 100 and 375 mesh	23½¢ to 27½¢
Copper, reduced, 150 and 200 mesh	22⅜¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.i.f. New York, carlots	7.65¢ to 8.5¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	63¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	25¢
Antimony, 100 mesh	30¢
Cadmium, 100 mesh	$1.75
Chromium, 100 mesh and finer	$1.25
Lead, 100, 200 & 300 mesh	13¼¢ to 16¾¢
Manganese, minus 325 mesh and coarser	44¢ to 61¢
Nickel, 150 mesh	51½¢
Silicon, minus 325 mesh and coarser	26¢ to 55¢
Solder powder, 100 mesh	8½¢ plus metal
Tin, 100 mesh	58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.60
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb	$2.65
Under 100 lb	$2.90

COKE

Furnace, beehive (f.o.b. oven)	**Net Ton**
Connellsville, Pa.	$7.50
Connellsville, Pa., hand drawn.	8.00
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.50
Foundry, Byproduct	
Chicago, del'd	15.10
Chicago, f.o.b.	14.35
New England, del'd	16.04
Kearny, N. J., f.o.b.	14.40
Philadelphia, del'd	14.63
Buffalo, del'd	14.75
Portsmouth, Ohio, f.o.b.	12.85
Painesville, Ohio, f.o.b.	13.50
Erie, del'd	14.50
Cleveland, del'd	14.55
Cincinnati, del'd	14.60
St. Louis, del'd	15.10†
Birmingham, del'd	12.25

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Per 1000
Super-duty brick, St. Louis	$76.05
First quality, Pa., Md., Ky., Mo., Ill., Ohio	60.40
First quality, New Jersey	65.90
Sec. quality, Pa., Md., Ky., Mo., Ill.	54.80
Sec. quality, New Jersey	57.70
Sec. quality, Ohio	52.95
Ground fire clay, net ton, bulk	8.95

Silica Brick	
Pennsylvania and Birmingham	$60.40
Chicago District	69.30
Silica cement, net ton (Eastern)	10.60

Chrome Brick	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	22.00
in sacks	26.00

Clinker (dead burned) dolomite, per ton East, $9.30; Midwest, add 10¢; Mo. Valley, add 20¢.

WAREHOUSE PRICES

Delivered metropolitan areas, per 100 lb.

Cities	SHEETS			STRIP			Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
				Hot-Rolled										
	Hot-Rolled (10 gage)	Cold-Rolled	Galvanized (24 gage)	6 in. and Under	Over 6 in.	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A-8617-20	Hot-Rolled, A-8742-50 Ann.	Cold-Drawn, A-8617-20	Cold-Drawn, A-8742-50 Ann.
**Philadelphia	$3.743	$5.097	$5.218a	$4.272	$4.172	$5.022	$3.855	$3.916	$4.072	$4.522	$6.016	$7.116	$7.372	$8.422
New York	3.815	4.838[1]	5.46	4.324	4.224	5.024	4.018	4.008	4.103	4.553	6.058	7.158	7.403	8.453
Boston	3.999	4.969[3]	5.674	4.456	4.356	4.965	4.162	4.162	4.294	4.594	6.212	7.312	7.444	8.494
Baltimore	3.619	5.077	5.344	4.252	4.152	....	3.844	4.009	4.052	4.502	6.109	7.209	7.352	8.402
Norfolk	3.996	....	5.821	4.515	4.415	....	4.221	4.252	4.315	4.615	....	....	....	....
Chicago	3.475	4.425	5.581	3.95	3.85	4.90[6]	3.80	3.80	3.75	4.20	5.80	6.90	....	8.00
Milwaukee	3.612	4.562[1]	5.537	4.087	4.077	5.037[6]	3.937	3.937	3.887	4.337	6.037	7.037	7.187	8.237
Cleveland	3.575	4.625	5.327	3.95	3.85	4.70[6]	3.65	3.838	3.60	4.20	6.006	7.106	6.95	8.00
Buffalo	3.575	4.625	5.20	4.163	4.109	4.959[6]	3.92	3.65	3.60	4.20	5.80	6.90	6.95	8.00
Detroit	3.675	4.725	5.45	4.05	3.95	....	3.859	3.911	3.70	4.25	6.13	7.23	7.55	8.65
Cincinnati	3.65	4.70[1]	5.275	4.025	3.925	4.961	3.911	3.941	3.861	4.461	6.15	7.25	7.311	8.65
St. Louis	3.622	4.572[1]	5.581	4.097	3.997	5.181[6]	3.947	3.947	3.897	4.481	6.181	....	7.331	....
Pittsburgh	3.575	4.625	5.20	3.95	3.85	4.70	3.65	3.65	3.60	4.20	5.80	6.90	6.95	7.95
St. Paul	3.797	4.747	5.635	4.272	4.172	5.352	4.122	4.122	4.072	4.811	6.202	6.302	7.352	7.402
Omaha	4.045	5.72	6.00	4.52	4.42	....	4.37	4.37	4.32	4.945	....	....	....	....
Indianapolis	3.745	4.795	5.37	4.12	4.02	4.99	3.88	3.88	3.83	4.43	6.13	....	7.28	....
Birmingham	3.675	....	5.20	4.05	3.95	....	3.80	3.80	3.75	4.903	....	....	....	....
Memphis	4.19	4.885	5.715	4.565	4.465	....	4.315	4.315	4.265	4.78	....	....	....	....
New Orleans	4.283*	5.304	5.808	4.658	4.558	....	4.408	4.408*	4.358*	5.079	....	....	....	....
Houston	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Los Angeles	4.85	6.60[1]	6.55	5.30	5.20	....	4.80	4.70	4.65	6.03	....	....	....	....
San Francisco	4.12	6.87	6.35	4.60	4.50	4.15	4.15	4.15	4.30	5.78	....	....	....	....
Seattle	4.87[5]	7.27[2]	6.40	4.60	4.50	....	5.00[5]	4.70[5]	4.60[5]	6.23	....	....	....	....
Portland	4.87[4]	6.82[2]	6.20	5.10	5.00	....	5.00[4]	4.70[4]	4.70[4]	5.98	8.15	....	9.20	....
Salt Lake City	4.75	....	6.62[7]	5.88	5.78	....	5.23[7]	5.23[7]	5.13	6.35	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars, 1500 lb base.

NE ALLOY BARS: 1000 to 39,999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 450 to 3749 lb; (4) 300 to 4999 lb; (5) 300 to 10,000 lb; (6) 2000 lb and over; (7) 3500 lb and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

* Add 0.271¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Per gross ton, retroactive to May 29.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	29.00	29.50	30.00	30.50	....	Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	....
Birdsboro	29.00	29.50	30.00	30.50	34.00	Boston	Birdsboro-Steelton	4.47	....	....	....	....	38.47
Birmingham	23.50*	24.88*	....	29.50	....	Brooklyn	Bethlehem	2.78	31.78	32.28	32.78	33.28	....
Buffalo	27.50	28.50	29.00	29.50	34.00	Brooklyn	Birdsboro	3.26	....	....	....	....	37.26
Chicago	28.00	28.50	28.50	29.00	....	Canton	Clev. Ygstn, Sharpsvil.	1.54	29.54	30.04	30.04	30.54	....
Cleveland	28.00	28.50	28.50	29.00	....	Canton	Buffalo	3.55	....	....	....	....	37.55
Detroit	28.00	28.50	28.50	29.00	....	Cincinnati	Birmingham	4.30	27.80*	29.18*	....	....	....
Duluth	28.50	29.00	29.00	29.50	....	Cincinnati	Hamilton	1.24	....	....	29.74	....	....
Erie	28.00	28.50	29.00	29.50	....	Cincinnati	Buffalo	4.89	....	....	....	....	38.89
Everett	29.00	29.50	30.00	30.50	....	Jersey City	Bethlehem	1.70	30.70	31.20	31.70	32.20	....
Granite City	28.00	28.50	28.50	29.00	....	Jersey City	Birdsboro	2.16	....	....	....	....	36.16
Hamilton	28.00	28.50	28.50	....	....	Los Angeles	Provo	5.25	31.25	31.75	....	....	....
Neville Island	28.00	28.50	28.50	29.00	....	Los Angeles	Buffalo	16.33	....	....	....	....	50.33
Provo	26.00	26.50	....	....	....	Mansfield	Cleveland-Toledo	2.16	30.16	30.66	30.66	31.16	....
Sharpsville	28.00	28.50	28.50	29.00	....	Mansfield	Buffalo	3.74	....	....	....	....	37.74
Sparrows Point	29.00	29.50	....	....	....	Philadelphia	Swedeland	0.93	29.93	30.43	30.93	31.43	....
Steelton	29.00	....	....	....	34.00	Philadelphia	Birdsboro	1.38	....	....	....	....	35.38
Swedeland	29.00	29.50	30.00	30.50	....	San Francisco	Provo	5.25	31.25	31.75	....	....	....
Toledo	28.00	28.50	28.50	29.00	....	San Francisco	Buffalo	16.33	....	....	....	....	50.33
Youngstown[1]	28.00	28.50	28.50	29.00	....	Seattle	Provo	5.25	31.25	31.75	....	....	....
						Seattle	Buffalo	16.33	....	....	....	....	50.33
						St. Louis	Granite City	0.50 Arb.	28.50	29.00	29.00	29.50	....
						St. Louis	Buffalo	7.86	....	....	....	....	41.86

* Republic Steel Corp. has been granted a $2 increase on basic and foundry pig iron produced at Birmingham.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorous content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$34.00; f.o.b. Buffalo—$35.25. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.05	6.30	6.60
Ton lots	6.65	7.55	8.55
Less ton lots	6.80	7.80	8.80

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Manganese Metal

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C, 7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05
Ton lots	6.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet.	5.80
Ton lots	6.30
Less ton lots	6.55

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $51.25 f.o.b. Keokuk, Iowa; $48.00 f.o.b. Jackson, Ohio; $49.25 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.

	Eastern	Central	Western
96% Si, 2% Fe.	13.10	13.55	16.50
97% Si, 1% Fe.	13.45	13.90	16.80

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si.

	Eastern	Central	Western
Carload, bulk	3.60	3.75	3.90
Ton lots	4.05	4.55	4.60
Less ton lots	4.45	4.80	4.85

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	7.05	7.50	7.65
75% Si	8.55	8.70	9.25
80-90% Si	9.50	9.65	10.15
90-95% Si	11.80	11.95	12.40

Ferrochrome

(65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
66-71% Cr, 4-10% C	14.50	14.90	15.00
62-66% Cr, 5-7% C	15.05	15.45	15.55

Briquets—contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.20	9.50	9.90
Ton lots	9.80	10.30	11.80
Less ton lots	10.10	10.60	12.10

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66.71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	15.60	16.00	16.10
Ton lots	16.65	17.30	18.50
Less ton lots	17.30	17.95	19.15

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Chromium—Copper

Contract price, cents per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.

Shot or ingot	45¢

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	16.50	17.35	19.10
Less ton lots	17.00	17.85	19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.35	$1.75	$4.25
Less ton lots	1.60	2.00	5.00

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	12.00	12.75	14.75
Less ton lots	12.50	13.25	15.25

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	11.75	12.50	14.50
Less ton lots	12.25	13.00	15.00

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	12.00	12.85	14.60
Less ton lots	12.50	13.35	15.10

Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed	$1.88
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	
Ton lots	$2.25
Less ton lots	$2.30
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads	$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	14¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	5.75¢
Ton lots	7.25¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	8.00¢
Ton lots	8.75¢
Less ton lots	9.25¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots.	$2.10	$2.1125 $2.1445

Silcaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

carload lots	25¢
Ton lots	26¢

Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Carload lots	58¢
Ton lots	59¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Gallup Polls

(CONTINUED FROM PAGE 103)

was quite evident as early as May.

During May a poll by the British Institute of Public Opinion found a five-point drop, as compared to 1945, in the proportion of Britishers saying they would vote for Labor if a general election were being held.

This poll foreshadowed with high accuracy the fate of the Labor Party more than two months later in the by-elections.

The share of the vote polled by Labor candidates in North Battersea, Pontypool, and Bexley was approximately five to six points less, on the average than what the party had polled in the same areas in the 1945 general election. Nor can Laborites justly claim that low voter turnout was responsible for their poor showing. The turn out in each of the three by-elections was 86 pct of the turnout in the 1945 general election.

The political situation shown in the May survey throughout all England is given below, with the 1945 election results for comparison.

	1945 Election Pct	May, 1946 Pct	Shift
Labor Party	49	44	—5
Conservative & Nat. Liberals	39	40	+1
Liberals	9	13	+4
Others	3	3	0

London Economist

(CONTINUED FROM PAGE 109)

between the Western Powers and Russia. And the Conference has revealed how much those rival *blocs* have hardened. Almost every word spoken is governed by consideration of that rivalry.

The agreement to admit the press to all proceedings of the Conference has laid this fact open in all publicity. In this respect, too, the present Conference represents a great advance on Versailles, where the press was admitted only to rarely held plenary sessions and not at all to committees. The Paris Conference is in a sense, an extreme reaction against the secret diplomacy of wartime. Like every extreme reaction, it has its unhealthy and dangerous features. In the limelight of publicity the rivalry between the Great Powers has been underlined. From now on speaking to the gallery is almost the rule;

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and the more fervently the leaders of delegations, small and big, speak to the gallery, the more are they committed to go on doing so, and so to drift into a perpetuation of *blocs*.

A glance at the picture in the *Salle des Pas Perdus* is enough to reveal the configuration of the powers. Mr. Molotov is seated there in the middle of the Eastern European group, with the Yugoslavs on his left, the Czechs and Poles on his right. Dr. Evatt is Mr. Byrnes's neighbor, almost at whispering distance. The Belgians and Dutch are physically within the British orbit even at the conference table. Very little care indeed is given even to appearing to avoid *blocs*. True, as satellites move within the orbits of their suns, they do sometimes deviate from their predicted course. But deviations are the exception and not the rule. This is not to say that each *bloc* is necessarily kept together or directed by its conductors. It has been said very rightly that the *bloc* of the British Commonwealth and the Americans is almost automatically cemented by two Ks—kinship and kingship. The same may also be argued about the Russian *bloc*, which needs no promptings from Mr. Molotov to act in unison. The two Ss—slavdom and socialism—cement it, whether deliberately coordinated or not. But the *blocs* have now become so rigid that the few independents, France or Norway, can lead only an uncomfortable existence in tight crevices between them.

This, then, is the mood in which the peacemakers have come together. And they are only beginning a long and arduous task. The present Conference is dealing only with minor fragments of the peace settlement terms for satellite countries, and not with problems on which peace really depends. Those, however, seem constantly to be at the back of the minds of the delegates and foreign ministers of the 21 nations. Yet they are never spoken of at the Luxembourg. The atmosphere there is somewhat similar to that peculiar air that can sometimes be observed around the bed of a gravely ill patient, when nobody dares to speak about real illness, when doctors suspect cancer, but members of the patient's household discuss tensely his digestion or catarrh.

If the doctors assembled at the

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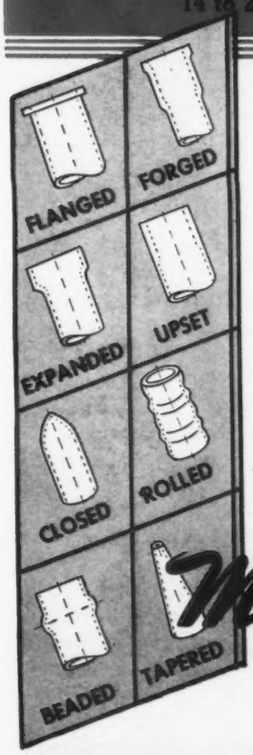

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Luxembourg Palace were to begin to speak about the real illnesses and dangers by which the postwar world is afflicted, they would not argue so violently about procedural irrelevancies. Instead, Mr. Byrnes would stand up and say to Mr. Molotov: "In the course of the war, under pressure of military necessities, we agreed to allocate to you a wide sphere of influence in Eastern and Central Europe. Now that the war has ended—I must frankly admit we cannot help having some second thoughts. We are afraid we have yielded to you too much. We were not quite clear how you would behave in your zone of influence and whether you would encourage Soviet revolutions in countries of your zone. We talked vaguely about the need to eradicate fascism and establish democracy there; but each of us put a different meaning into those formulas. We now see you organizing the countries of your zone on the pattern of your own Soviet system; and we are certainly afraid that you may attempt to carry that system even beyond your zone. This is the grave dispute between us, and you need not be surprised that we try to regain ground we had yielded to you."

Mr. Molotov would then thus argue his case: "Surely your second thoughts bode no good for Soviet Russia. I have reasons to suspect that you are going to tear up agreements which we reached when we were comrades in arms. And indeed at this Conference you already appear to be trying to undo our joint decisions on this Conference, reached only a few weeks ago. And, above all, I cannot ignore the ominous fact that even now, in the second year of peace, you still produce atomic bombs. You may not wish to give away to me the secrets of their production. You would be acting in a very magnanimous way if you did, and I don't expect such magnanimity; but why on earth do you continue to manufacture them? Against whom are your atom bombs going to be used? You need not be surprised if I am in a suspicious mood. Indeed, it seems to me that mankind ought to be warned about your doings behind which there may be sinister intentions." But the doctors in the Luxembourg Palace prefer not to talk about the cancer; and the Conference rooms still resound with involved and unreal disputes.

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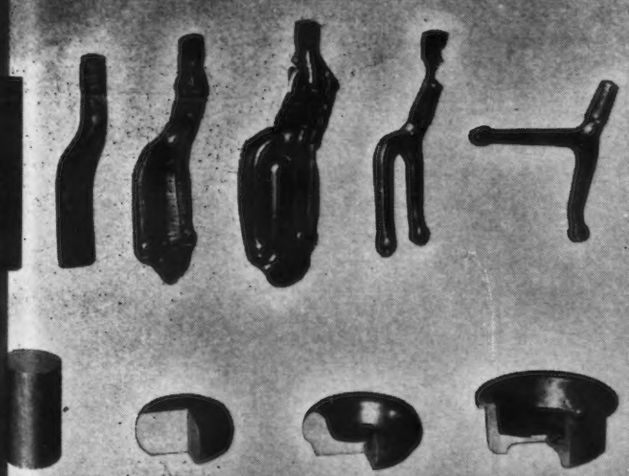
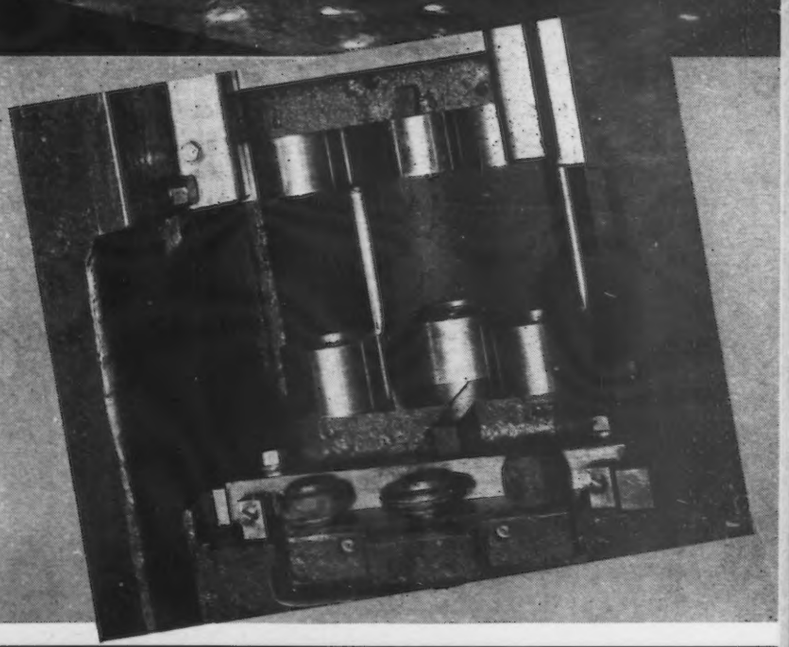
Write for Bulletin No. 75





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Australian Tantalite Developed for Radar Still Vital to Industry

Canberra

• • • **When scientists** invented and developed radar, the United Nations found themselves in need of a metal whose richest, purest and most valuable deposits exist in a little-known and almost desert corner of Australia. The metal was tantalum, and the fabulously rich deposits of tantalite, from which it is obtained, are far up on the north coast of Western Australia, at a place called Wodjina, that isn't even marked on most maps.

For years tantalum, so called because of the enormous difficulty and expense of obtaining it from the ore, has been used for the hardening of steel, and in electrical apparatus, as a substitute for platinum. Like platinum, it is extremely heavy and immensely expensive—a ton of refined tantalum costs $123,000.

It is used for the manufacture of files, pen parts, watch springs and various precision instruments. It can be beaten into plates and sheets as thin as paper, and is much more malleable than gold or silver, which makes it capable of being drawn out into wires so fine that, when they are used to sew wounds, they leave no scar.

During the war, scientists found that this metal possessed a number of properties which had not previously been known, particularly in the field of surgery. It could be used plastically, they discovered, to restore disfigurements, and as a substitute for bone. Ordinarily, living tissues keep away from foreign substances, but with tantalum, this is not so. Flesh, blood and bones cling so closely to it that surgeons are beginning to think that the living tissue actually attaches itself to the metal.

Australia was the first country to produce tantalite in quantity. As far back as 1905, Wodjina produced 80 tons, and from then on a small production was kept up. Prices were much lower then, and most of the ore went to Germany, where scientists were carrying out the first experiments on the new metal. When the first World War

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broke cut, America took up the research.

Production kept going in a small way, until 1930, when a small company was formed, under the leadership of Deborah Buller-Murphy, who owned most of the shares. A woman, in fact, was in virtual control of one of the world's vital metals.

At the time firms in the United States, Germany and Japan began to show interest in Australian tantalite. Almost all of the production went to those countries, so that at the outbreak of war exporting substantially declined, through lack of markets.

At the same time, tantalum was needed for all those purposes that war made more urgent, and late in 1942 the U. S. Government advised that it desperately needed tantalite. The Australian Government immediately took over the Wodjina fields, and installed machinery to increase production. So great was the urgency that at times cargoes of the ore were flown out in American service planes. When it was found that electronic tubes using tantalum were needed for radar, the urgency became even greater.

It was needed for the making of butadiene, too—the synthetic rubber that came into being when natural rubber was unavailable—and it was urgently needed for the manufacture of carbide tools.

Now that the war is over, radar is being taken over for the purposes of peaceful navigation. Tantalum will still be needed for this, for special lens glass in aerial cameras, and for spinnerets in making rayon and other synthetic fibres. Doctors will still need it for instruments and for artificial parts; industry will need it for pump and valve parts and temperature-control instruments.

French Factory Workers Get 18 Pct Pay Raise

Paris

• • • **Under an** agreement announced by the French Government, over 12,000,000 factory and office workers will have their wages raised by an average of 18 pct from July 1. The increases will cost between 70,000,000,000 francs (about $580,000,000) and 80,000,000,000 francs ($666,000,000).

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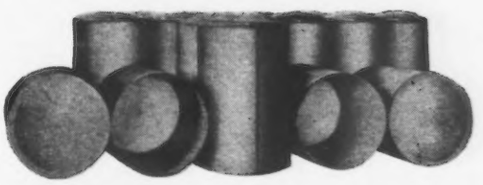

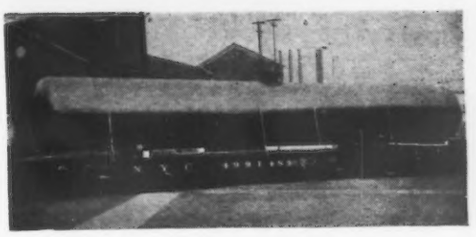

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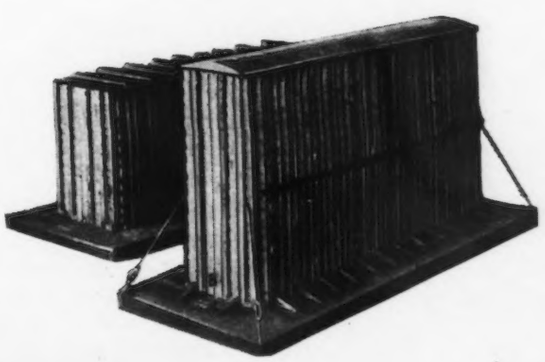

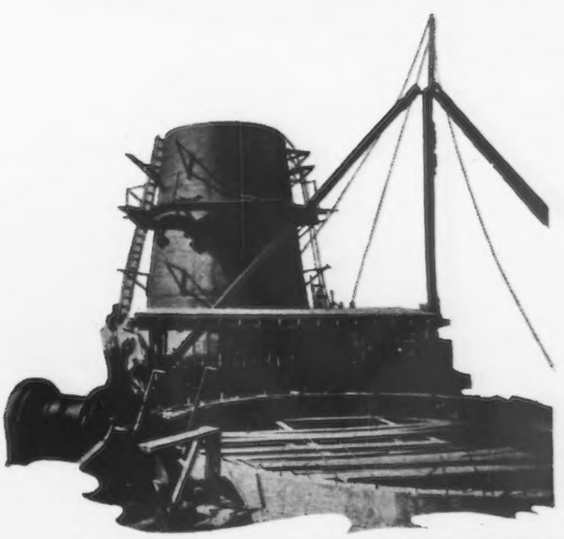

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Turbochargers Get First Civilian Use on Boeings

Schenectady, N. Y.

• • • **First commercial** application of General Electric's turbo-superchargers, which were used extensively during the war to give U. S. fighter planes and bombers increased power and altitude, will be on 50 Boeing Stratocruisers to be built for world airline operations. G.E. has announced that the Boeing Aircraft Company has ordered 200 turbosuperchargers to be installed on the Stratocruisers, first production model of which is scheduled for early 1947 completion, when it will be delivered to one of the four airlines which will operate the planes.

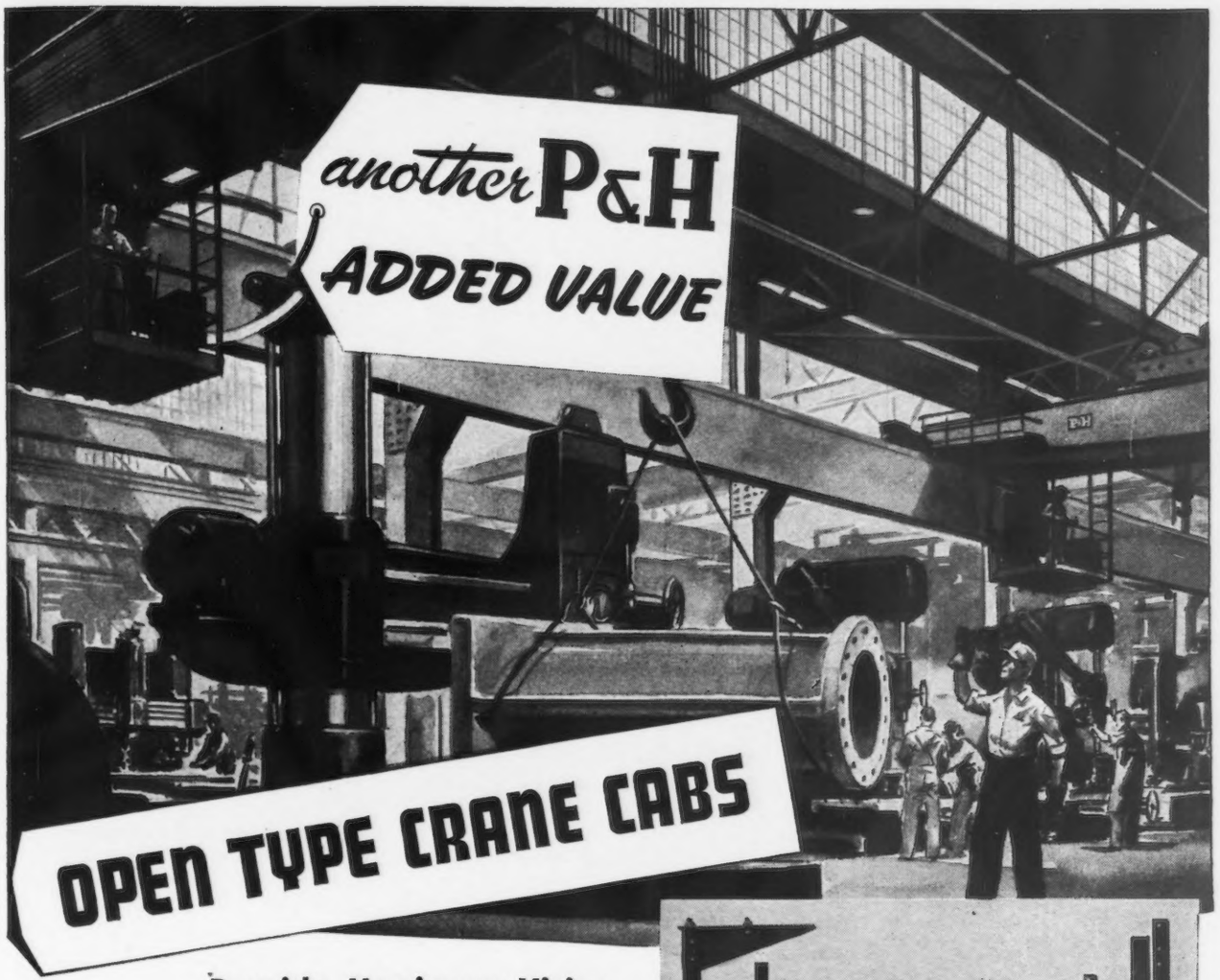
The turbos will be housed in the nacelles of the huge 3500-hp Pratt and Whitney engines. Smaller and lighter in weight than the installation used in B-29 bombers, they are designed to supercharge the engines during flight but not during takeoff. They are expected to save up to 14 pct in fuel consumption at cruising altitudes, which will result in a substantial decrease in operating costs and an increase in the range of the plane.

Designed to fly at altitudes between 15,000 and 30,000 ft., the Stratocruiser will carry up to 114 passengers, while 50 to 80 passengers will normally be accommodated on trans-continental or trans-oceanic trips. The plane has a wing span of 141 ft. and an overall length of 110 ft. Take-off weight is 135,000 pounds.

Trade Mark Users Get Additional Protection Under Newly Passed Act

Washington

• • • **To become effective** July 5, 1947, the recently passed Lanham Trade-Mark Act brings the trademark laws under a single statute and has been hailed by Commissioner of Patents Casper W. Ooms, as giving additional protection to users of trade-marks and trade names. He pointed out that a provision in the law making a mark incontestable after five years of registration and continuous use confers on the trade-mark owner a security not heretofore available and will make registration more desirable. It was explained, how-



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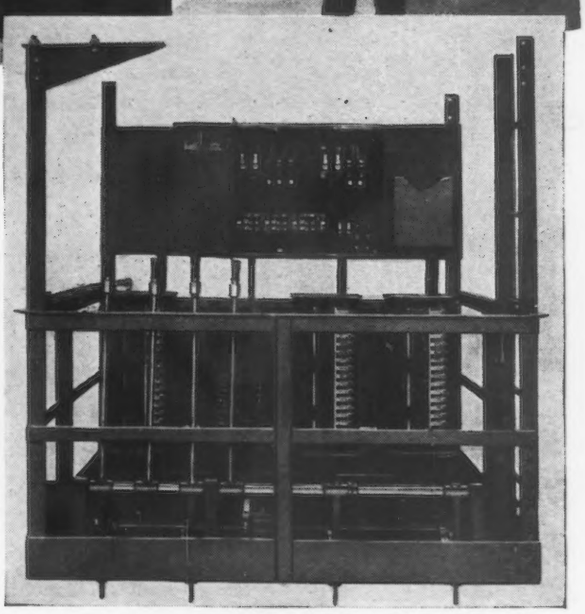

View of P&H standard four controller cab with drum covers removed and safety cabinet open. Note how full vision is possible in all directions. Also grouping of full length front levers on hook side of cab.

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ever, that the statute prevents marks from becoming incontestable when they have in fact been in prior use by another, were fraudulently registered or when they have been abandoned, used to misrepresent the source of goods or to violate the Federal anti-trust laws.

Three classes of trade-marks not registrable under the old law may be registered under the Lanham Act, Mr. Ooms said. They are marks which are merely geographical but which have through long use acquired true trade-mark characteristics; marks used simultaneously by two traders in remote and independent territories who have each acquired true trade-mark rights, and marks used by service establishments which do not manufacture or sell merchandise.

So called certification marks, used as the seal of approval of a laboratory which checks and certifies to the compliance of merchandise with certain standards, may also be registered under the new Act. However, several limitations are placed on the registration of such marks: They may be used only as certification marks and the owners cannot apply them to goods of their own manufacture; and they cannot deny certification to any person who complies with their prescribed standards.

The new law makes it easier to sell or otherwise transfer a mark to a new owner, it was stated, and gives special protection to newspapers, printers and others who may innocently and incidentally participate in trade-mark infringement.

A new schedule of fees, slightly higher than those now in effect, is established by the Act. The new fees are designed to cover the increased costs of administering the Trade-Mark Act, Mr. Ooms said.

Present trade-mark owners who wish to secure the benefit of the incontestable provision of the Lanham Act are permitted to republish their marks, thus bringing them under the new law. This is expected to result in the republication of thousands of marks now registered and should help in eliminating from the register marks no longer in use, Mr. Oooms said.

Packaged Manufacturing Plants for Foreign Use Planned on West Coast

San Francisco

• • • **Circumstances that** retard the revival of world trade have given rise to a new idea that may alter existing conceptions in the field of foreign manufacture. American engineers have in the advance stages of development what they term the "packaged manufacturing plant" for export to foreign manufacturers.

The plant is a complete production unit, including building and all necessary machinery for the process to be undertaken, prefabricated and ready for re-erection in the shortest possible time. The package includes services of the engineers who designed it in putting the plant into operation, training local labor to operate it, and consultation in new developments.

After exhaustive research, particularly in the Latin American market, a group of West Coast engineers headed by Intercontinental Engineering Corp., San Francisco, concluded that shortages of basic products in foreiegn countries can be effectively remedied only through the local manufacture of such products. To that end, plans are going ahead for the design, construction and export of these small compact units for the manufacture of everything from storage batteries to asbestos shingles, from laundry soap to refined oil products.

The engineering group cites a number of reasons for its conclusions. For one thing a postwar desire for nationalization is prevalent in the smaller countries throughout the world, particularly in Latin America. The worldwide shortages of various manufactured products, occasioned for the most part by the wrecking of German and Japanese industry in the war; the inability of the great producing nations to fill their own domestic demands, with consequent restrictions on exports; and other factors have left the smaller countries, although in many instances affluent in ready cash, poor in imported basic products.

Among Latin American nations, oil rich Venezuela is typical of the new trend. Venezuelans made

money during the war years, still have it in abundance and are willing to spend it. But shortages in the United States and Britain of the very products Venezuela needs have made it virtually impossible to fulfill her demands. Industrialists and other important personages figuratively have said, "We'll make our own." And reports from Venezuela are that its people are waiting only to determine the results of national elections in October before they start on the biggest construction and industrialization program in their history.

Similar programs, limited by the availability of manufacturing equipment, already are under way in many countries. On the spot surveys and inquiries now flooding into the United States from abroad indicate that industrialization of foreign countries will encompass the establishment of plants to manufacture a wide and varied range of products. Intercontinental Engineering Corp. currently is at work on design of packaged plants for the making of asbestos tile, asbestos and asphalt roofing, gypsum wallboard, storage batteries, and glass containers, and plans to expand the work shortly to include small oil refineries, brick kilns, steel fabrication plants, iron and steel foundries, textile mills and paper mills.

The packaged plant is based on the smallest economical production unit, determined by the volume of demand in the market to be served, cost of production of the item to be made, wage scales and other factors such as whether or not the economy of the country favors labor saving devices. The design includes the smallest prefabricated industrial building capable of housing the necessary machinery. Machinery and facilities are standardized to conserve space and keep down costs.

Negotiations are under way at the moment between the engineering group and builders of prefabricated housing units and manufacturing machinery to produce packaged manufacturing plants. When completed units are sold, a representative of the engineers will accompany the plant to its foreign destination, supervise its erection, train the foreign labor for its operation, and, if need be, undertake its active management for a limited period of time.

Steam Turbine Studies Set Up by Allis-Chalmers

Milwaukee

• • • **Steam turbine plant** operators have been invited to participate in a cooperative study, to increase their power plant efficiency through an analysis of the nature and cause of troublesome turbine blade deposits, it was announced by the Allis-Chalmers Mfg. Co., Milwaukee. Expanded research, for gathering data from turbine units will be conducted by the water conditioning and steam turbine departments.

Analyses, without charge or obligation, of the deposits from any make of turbine operating at pressures of 350 lb or higher, will be made provided samples of the blade deposits are taken in accordance with certain recommended procedure. Initial investigations, by Allis-Chalmers Co., have revealed significant data. More samples of deposits, however, must be analyzed in order to arrive at a proper conclusion.

CPA Fears Dislocation Of Sheet Distribution

Washington

• • • **While agreeing that** there is a critical need for increased supplies of steel sheet in the container industry, CPA told the Steel Shipping Containers Industry Advisory Committee that "any effort to extend priorities aid would dislocate present distribution of steel sheets, without relieving the present shortage."

In effect, CPA said that it would not grant priorities which would "rob Peter to pay Paul," and that the only solution lies in the present expansion program in the steel industry, designed to bring total sheet making capacity up to approximately 16,000,000 tons annually. Some of the new rolling facilities are expected to be completed in the next 6 months.

CPA said, however, that consideration will be given to recommendation of the committee that MM ratings be investigated closely to avoid unnecessary impact on the industry. CPA also agreed to consider the recommendation that the needs of the industry be reviewed with an attempt being made to channel more steel sheets for use in containers.

Alloy Casting Institute Elects New Officers At Its Annual Meeting

New York

• • • **The increasing** importance of the Pacific Coast in the Nation's heavy metals picture was recognized when E. C. Hummel, vice-president and general manager of the Utility Electric Steel Foundry of Los Angeles, was elected president of the Alloy Casting Institute, a nationally-known research organization with executive offices here, at the annual meeting of the Institute recently, held at Galen Hall, Wernersville, Pa.

Other officers of the Institute elected at the meeting were: vice-president, J. B. Shelby, assistant vice-president, Driver-Harris Co., Harrison, N. J.; executive-secretary and treasurer, E. A. Schoefer. In addition, G. A. Baker of the Duriron Co., Inc., Dayton, was elected chairman of the Technical Research Committee; J. D. Hagans of the Ohio Steel Foundry Co., Springfield, Ohio, and R. A. Hipke of the Sivyer Steel Casting Co., Milwaukee, were elected as members of the board of directors.

Mr. Hummel, long active in Los Angeles civic affairs, is president of the Metal Trades Manufacturers' Assn. of Southern California, southern regional vice-president of the California State Chamber of Commerce, and a regional director of the National Assn. of Manufacturers.

"The great industrial growth of the Pacific Coast," according to Mr. Hummel, "makes the use of high alloy steel of great importance because of the types of industry in the region. High alloy castings have very important applications in the oil industry, where they are used for refinery equipment and synthetic rubber production; valves, fittings and other critical working parts in chemical plants, food and citrus fruits processing, pulp and paper production, ore refining and textile manufacturing are made predominantly from the high chromium, nickel, molybedenum compositions.

"The aircraft industry has made

extensive use of high alloys in supercharger design, as well as working parts of jet propulsion power plants.

"Gas turbines and certain types of marine equipment require heat and corrosion resistant materials in important operating areas.

"The Alloy Casting Institute comprises a majority of the producers of corrosion and heat resistant alloy castings in the United States. The principal function of the Institute is the conduct of research into the properties of, and development of new uses for, all types of stainless and heat resistant castings. For a number of years major research projects have been contracted for on an annual basis at Battelle Memorial Institute in Columbus, Ohio. From results obtained, many advanced uses of these complex alloys have been developed for the benefit of the great basic and other industries which have all played a major role in the industrial growth of the Pacific Coast."

Britain's Coal Supply Below Safety Margin

London

• • • **Britain's Minister** of Fuel and Power told the House of Commons that, although facing the prospect of starting next winter with coal stocks 5,500,000 tons below the safety margin, he thought Britain should get through, but there was not much hope of immediate improvement in the vital field of exports.

He reported that Britain's coal consumption was greater at the present time than ever before in her history. The gas industry's consumption was 24 pct higher than in 1938 and electricity 76 pct, and these increases were largely responsible for the present position. To reduce consumption the use of oil is being encouraged. The Great Western Railway had already converted 10 locomotives to oil and was converting another 40. It was estimated that the use of 2.24 million tons of oil would save 3.36 million tons of coal. By oil conversions and other measures it is expected to reduce the total estimated deficit of 1.12 million tons to five and a half million tons.

Westinghouse Reveals New Rocket Weapon To Be Used Underwater

Sharon, Pa.

• • • **Rocket power,** most recently harnessed force for propelling planes and projectiles through the air, has now been adapted for use under the sea.

The weapon, a new aerial torpedo—called the Hydro-Bomb—uses the thrust of burning, expanding gases to propel itself through water instead of air. It was developed and built for the Army Air Forces by the Westinghouse Electric Corp. and was nearly ready for combat use as the Japanese capitulated.

The simplest and the least expensive to manufacture of all aerial torpedoes, the Hydro-Bomb was to be the answer to the Army Air Forces' appeal for a fast missile that could stand the shock of being dropped 600 ft or more from a plane going 300 mph and permit the torpedo-carrying plane to keep out of the range in which anti-aircraft fire becomes almost deadly.

From the idea of a rocket motor was developed the Hydro-Bomb, the engine of which is nothing more than a large pipe packed with solid fuel which, when burning, creates expanding gases that are expelled through a nozzle. Escape of the expanding gases through the nozzle sets up a reaction against the Hydro-Bomb like the kick of a discharged shotgun, thus pushing it through the water. At one place the nozzle is only 0.62 in. wide to compress the gases, then it expands like the barrel of an ancient blunderbus, being 2¾ in. in diameter at the end.

The Hydro-Bomb has much the appearance of a submarine torpedo. It is slightly shorter and has a diameter approximately 2 in. greater than most torpedoes. Its warhead can carry approximately 600 lb of high explosive and the rocket motor can push it through water at 40 knots—a speed comparable with that of the fastest compressed air or electric torpedoes.

When the Hydro-Bomb is dropped from a plane speeding at 300 mph or more, the impact on striking the water throws a switch that ignites the rocket motor's solid fuel. The motor can develop a

thrust of 1000 lb. Electrical controls with a gyroscope keep the bomb on the path in which it was aimed and special controls regulate the under water depth.

The initial major problem of designing a rocket motor that could give a sustained thrust for the required period was followed by many other problems that were eventually worked out.

Virtually every part of the Hydro-Bomb had to be shock treated to withstand the terrific impact occasioned when it was dropped from heights well above those for the normal aerial torpedo. The gyro and depth controls all were shock-treated as was the rocket motor. To keep impact from damaging the rudders and elevators, a ring of steel was placed around them in such a manner as to absorb the shock and still allow them free operation.

A water trip switch had to be devised that would work every time, yet not be affected by the tremendous speed with which the torpedo passed through the air. Safety measures to assure that the rocket motor would not start while attached to the plane were necessary, resulting in development of a fuse which kept electrical contacts shorted until the Hydro-Bomb left the plane. Special gaskets that expanded equally with the metal parts under heat of the rocket motor also were developed.

Drexel Institute Adds Metallurgical Courses

Philadelphia

• • • **The appointment** by the board of trustees of Drexel Institute of Technology of an advisory committee on metallurgical engineering and the immediate introducing at Drexel of courses in metallurgical engineering was announced by Dr. James Creese, president of Drexel.

The advisers from industrial laboratories and plants who have accepted the appointment to the advisory board include Dr. G. H. Clamer, president of the Ajax Metal Co.; William J. Diedrichs, metallurgist, Autocar Co.; Francis B. Foley, superintendent of research, Midvale Co.; Clyde B. Jenni, metallurgist, Central Steel Casting Corp., and Joseph Winlock, chief metallurgist, Edward G. Budd Mfg. Co.

AFA Membership Hits Twice Prewar Figure, Gains 727 in Past Year

Chicago

• • • **Membership** in the American Foundrymen's Association has more than doubled since 1941 and on June 30 was at a new high of 8,539 companies and individuals, Sheldon V. Wood of Minneapolis, 1945-46 membership committee chairman, revealed at the association's third annual chapter chairmen conference in Chicago recently. Mr. Wood, now president of the technical society, is president and general manager of Minneapolis Electric Steel Castings Co.

The new membership peak represents a net gain of 727 members compared to a year earlier and an increase of 1,919 since June 30, 1944, Mr. Wood pointed out. Foreign memberships, excluding Canadian, increased 92 pct to 392 during the past year and personal memberships of all types exceeded the June 1945 total by 889 or 15 pct.

Membership in the association's 32 chapters totaled 7,767 on June 30 this year against 7,110 a year earlier. Two chapters—Chicago and Wisconsin—are in the "over 500 bracket" and five—Detroit, Metropolitan, Northeastern Ohio, Philadelphia and Southern California—have rosters of 300 to 500 members, the report showed.

With the aim of a better coordination of national organization and chapter activities, 36 newly elected chapter officers and AFA officials discussed such subjects as program building, educational courses, apprentice work, vocational guidance efforts, cooperation with engineering schools and societies, AFA's technical, research and publishing programs, community relations, and chapter operation highlights at the 2-day Chicago conference.

In addition to Mr. Wood as president, the 1946-47 executive committee of the American Foundrymen's Association is constituted as follows:

Max Kuniansky, vice president-general manager, Lynchburg Foundry Co., Lynchburg, Va., the society's vice president, and the following directors: James H. Smith, assistant to the vice president, accessories group, General Motors Corp., Detroit; Joseph Sully, president, Sully Brass Foundry, Ltd., Toronto; Fred J. Walls, manager, Detroit office, development and research division, International Nickel Co., Inc., immediate past president, and L. C. Wilson, Reading, Pa.

U. S. EXPORTS OF MACHINE TOOLS

Year	Machine Tool Production (National Machine Tool Builders Assn.)	Machine Tool Exports (U. S. Dept. of Commerce)	Percent Machine Tool Exports to Total Machine Tool Production	Percent Machine Tool Exports to Total U. S. Exports
1918	$220,600,000	$27,642,000	12.5	0.45
1919	161,000,000	28,122,000	17.5	0.36
1920	151,500,000	25,482,000	16.8	0.31
1921	36,000,000	8,967,000	24.9	0.20
1922	43,300,000	3,278,000	7.5	0.08
1923	79,300,000	4,280,000	5.4	0.10
1924	69,600,000	5,572,000	8.0	0.12
1925	86,700,000	10,492,000	12.1	0.21
1926	105,000,000	7,200,000	6.9	0.15
1927	87,000,000	12,800,000	14.7	0.28
1928	128,000,000	15,600,000	12.2	0.30
1929	185,000,000	19,200,000	10.4	0.36
1930	96,000,000	17,100,000	17.8	0.44
1931	51,000,000	16,800,000	32.9	0.69
1932	22,000,000	6,200,000	28.2	0.38
1933	25,000,000	4,400,000	17.6	0.26
1934	50,000,000	12,100,000	24.2	0.56
1935	85,000,000	17,400,000	20.5	0.76
1936	133,000,000	24,900,000	18.7	1.02
1937	195,000,000	38,500,000	19.7	1.15
1938	145,000,000	64,600,000	44.6	2.09
1939	200,000,000	79,800,000	39.9	2.52
1940	440,000,000	185,700,000	42.2	4.66
1941	775,000,000	166,500,000	21.5	3.24
1942	1,320,000,000	157,500,000	11.9	1.96
1943	1,180,000,000	237,100,000	20.1	1.87
1944	497,000,000	163,600,000	32.9	1.17
1945	407,300,000	78,500,000	19.3	0.82

Receives ASM Award

Cleveland

• • • **Dr. Rufus E. Zimmerman,** vice-president in charge of research and technology of the U. S. Steel Corp. of Delaware, has been elected to receive the American Society for Metal's Medal for the Advancement of Research for 1946.

Qualifications of the candidate of award of this medal do not specify that any one research achievement shall be the basis for the award, according to ASM. Rather, the qualifications state that the "candidate shall be an executive in an industrial organization, the principal activity of which is the production or fabrication of metals."

"The candidate shall be one who, over a period of years, has consistently sponsored metallurgical research or development and by his foresight and his influence in making available financial support, has helped substantially to advance the arts and sciences relating to metals."

Award of the medal, plaque and citation will be made at the annual banquet of the American Society for Metals to be held in Atlantic City, N. J., on Nov. 21 during the National Metal Congress and Exposition.

The medal was first awarded in 1943 to Roy A. Hunt, president of the Aluminum Co. of America. It was won in 1944 by Robert C. Stanley, president of the International Nickel Co., and in 1945 went to Gerard Swope of the General Electric Co.

Dr. Zimmerman is a director and member of the executive committee of the United States Steel Corp. of Delaware; member of the Corporation M.I.T., trustee of Hood College and Franklin and Marshall College; president of the American Standards Association; member of the Metallurgical Advisory Board of the Carnegie Institute of Technology; director of the Air Hygiene Institute; member of the Engineering Advisory Council of Princeton University and was a consulting chemical engineer of the United States Bureau of Mines during the war.

Surplus Aircraft Sale Attracts 104 Bidders

Washington

• • • **One hundred and** four bids have been received by the War Assets Administration for the purchase of nearly 21,000 surplus tactical aircraft for scrap, salvage, and other non-flight purposes.

No awards have been made on these bids which are subject to compliance with all terms of sales and approval of the Dept. of Justice.

The high bidders, together with the approximate number of planes at each field, are:

Martin Wunderlich, Jefferson City, Mo., $2,780,000 for 5540 planes at Kingman, Ariz.; Sherman Machine and Iron Works, Oklahoma City, Okla., $1,168,550 for 7600 planes at Clinton, Okla.; Texas Railway Equipment Co., Houston, Tex., $1,817,738 for 4890 planes at Walnut Ridge, Ark.; Compressed Steel Co., Denver, Colo., $411,275 for 1540 planes at Albuquerque, N. Mex.; and Sharp and Fellows Contracting Co., Los Angeles, Calif., $404,593 for 1390 planes at Ontario, Calif.

Each buyer is required to take all tactical planes at the field on which he is the successful bidder. However, only one field of planes may be purchased by one buyer. The purchasers must agree that the planes will not be used for flight purposes. The successful bidders will be required to pay 10 pct down and the balance during the period specified for clearance of the fields, which varies from 9 to 14 months. WAA will also stipulate that all aluminum scrap must be disposed of within 18 months of the date of sale.

Steelman Announces Union of OES and OWMR

Washington

• • • **A reorganization** which merges the Office of Economic Stabilization with the White House-revived Office of War Mobilization and Reconversion has been announced by John R. Steelman, director of both war-born agencies.

"Responsibilities of OWMR remain unchanged by this reassignment of functions," Steelman said. "It integrates the staffs of OWMR and OES and will eliminate dupli-

cation of function as well as cut operational expenses."

Steelman will have as aids a special assistant, three deputy directors, and a general counsel. Harold Stein will be deputy director for production, stabilization and war liquidation; Donald Kingsley, deputy for fiscal policy, employment and social security; and Anthony Hyde, deputy for information and reports.

Commander Joseph L. Miller, USNR, and Edward J. Hays will continue to serve as special assistant and general counsel, respectively.

Britain Settles Coal Compensation Figure

London

• • • **Britain's Coal** Industry Compensation Tribunal has awarded $658,640,000 as the global sum of compensation to be paid for certain assets of the coal industry to be transferred to the National Coal Board under the Coal Industry Nationalization Act. The assets covered by the award are broadly described as the assets of the coal industry, excluding subsidiary assets such as coke oven and by-product plant.

The compenation figure has been based upon the net annual revenue that might reasonably be expected to be earned in the future if the assets had not been transferred to public ownership multiplied by the number of years' purchase as determined by the tribunal. Now that the value is settled, the next step is to apportion the $658,640,000 among the various districts, and for this purpose a central valuation board has been set up. Further breaking down of the sum to recipients within the districts will be the task of the district valuation boards, with right of appeal to panels of referees.

Two years has been given as a likely time that will elapse before individual companies know what they are to receive. The money will generally be distributed in the form of British Government stock, and payment in cash will be made only in exceptional cases.

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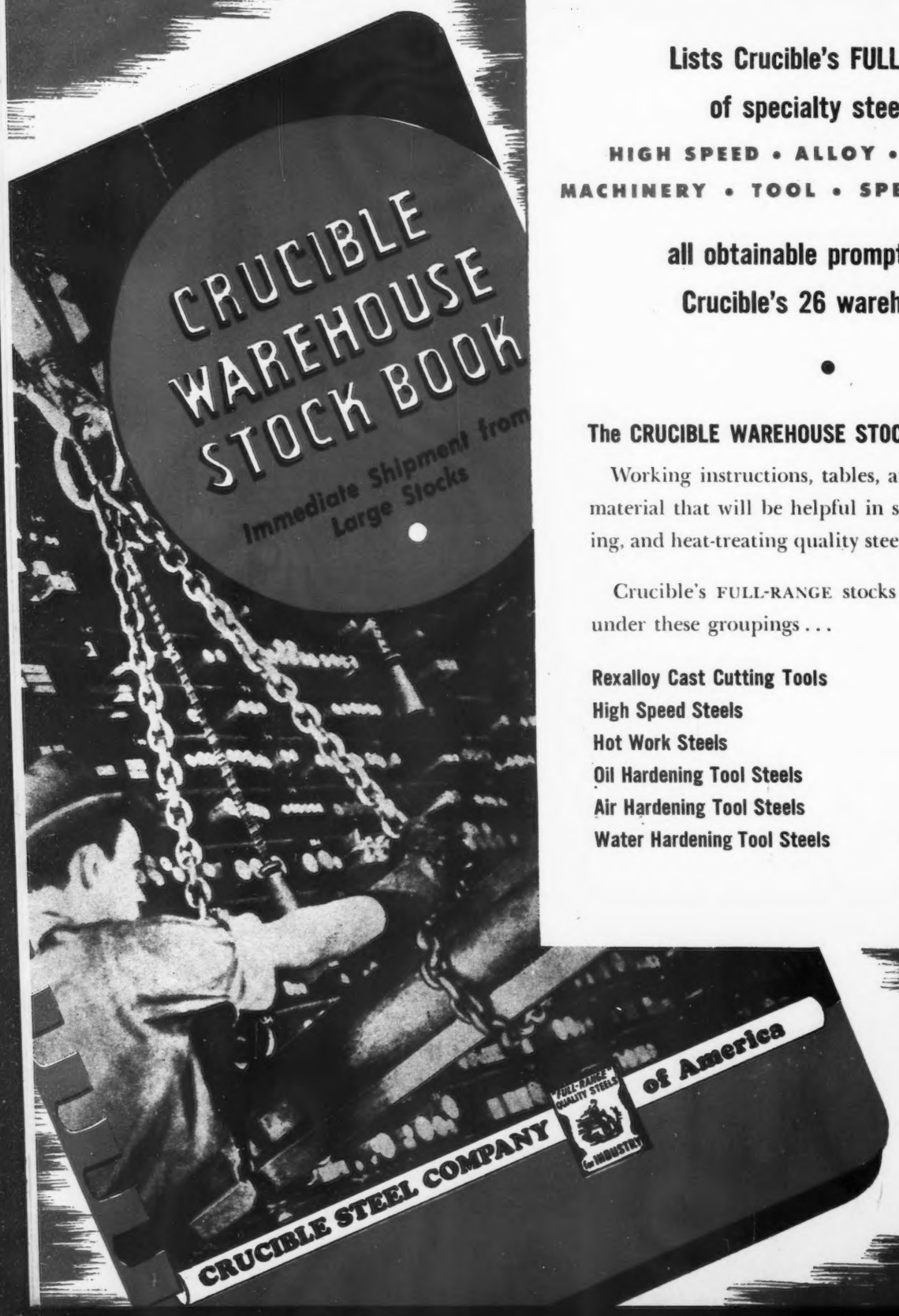

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